AVIATION WEEK

SEPT. 5, 1955

50 CENTS

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A PLOT OF AIR HISTORY

The U. S. Navy tracks aircraft on a transparent board as radar reports their positions. Plot the most famous Navy and Marine fighter planes as reported by history, and Grumman aircraft fill the board.

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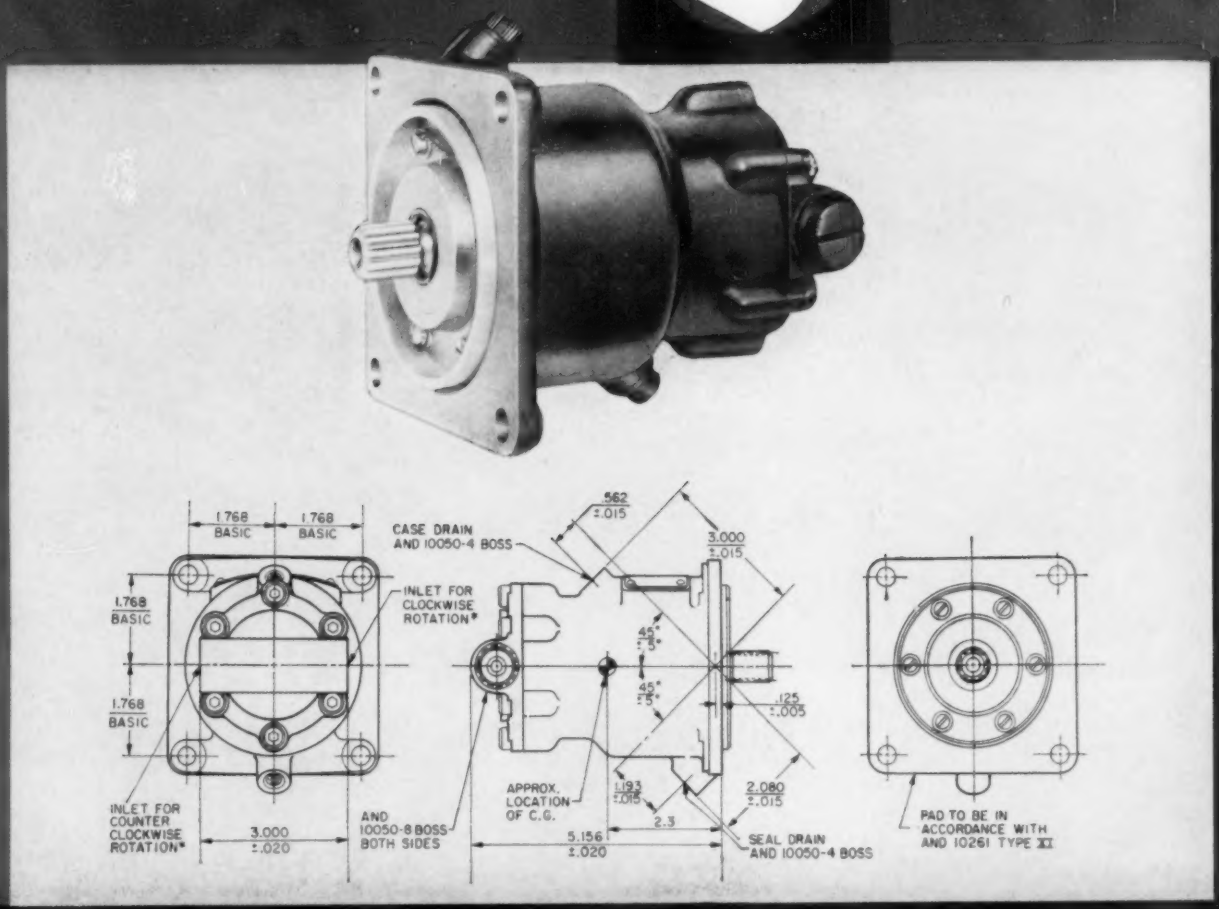

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Sundstrand Aviation announces a new line of Aircraft Hydraulic Motors having unusually high Hp/Wt ratio combined with long life at continuous duty.

Typical of this new line is the model illustrated, which has a displacement of 0.6 cubic inches. While it has a *continuous duty* rating of 25 hp at 6000 rpm at 3000 psi, it weighs only *5.9 lbs.!* Send for Bulletin 124 for more information about this and other motors of the new line. Your inquiry about special motors and controls is invited.

High Hp/Wt ratio

1. Few component parts for maximum reliability
2. Small envelope
3. High operating speeds
4. Capable of continuous operation at 3000 psi at rated speed
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6. High torque-to-inertia ratios for rapid cycling or rapid reversing
7. Dynamically balanced
8. Operating temperatures of —65° to 275° F

SUNDSTRAND AVIATION

Division of Sundstrand Machine Tool Company, ROCKFORD, ILLINOIS • Western District Office: Hawthorne, California

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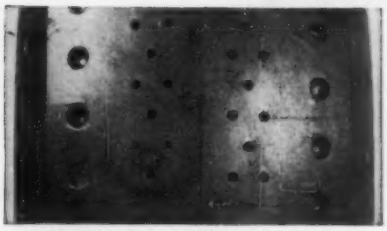
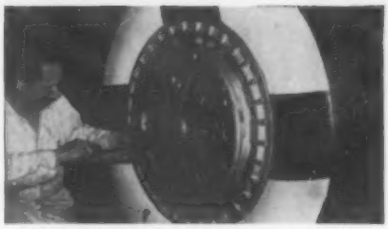
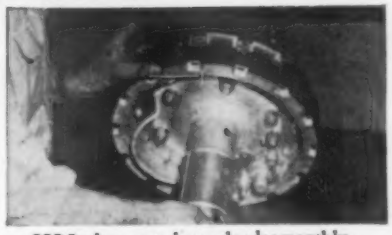
RESEARCH KEEPS **B.F.Goodrich** FIRST IN RUBBER



BFG Dimpled Tubeless Tires—save weight, cut costs, make safer landings.



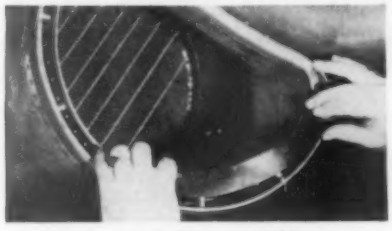
BFG Wheels—combine great strength with lightest weight.



BFG Brakes—stop heavy loads smoothly, efficiently.

BFG Inflatable Seals—keep pressurized canopies airtight.

BFG Pneumatic De-Icers—snap ice off leading edges.



BFG Heated Rubber—provides spot heat, keeps ice from forming.

B. F. Goodrich research develops 11 stars for your team

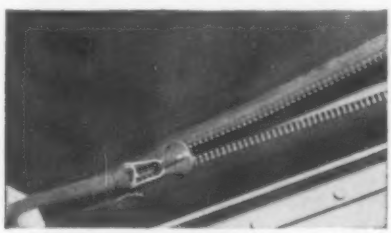
HERE YOU SEE the B. F. Goodrich "varsity"—11 major aeronautical products. Each is essential to the safe, economical operation of modern commercial and military planes. Most are forerunners in the field. Some, like BFG De-Icers and tires, have changed drastically from the designs that were successful just a few years ago.

In fact the evolution of designs is more significant than the impressive variety of B. F. Goodrich products. For it is in research and development that we tackle your toughest problems: how to trim weight, reduce costs, improve performance.

To solve these problems, B. F. Goodrich set up the first laboratory (now at Brecksville, Ohio) for basic research in rubber. There, and at the BFG wheel and brake plant in Troy, Ohio, facilities now include electronic computers that solve design problems in minutes that used to take months to work out. In Akron, there's a task force of engineers who apply the results of research to the development of new products for every conceivable type of plane and use.

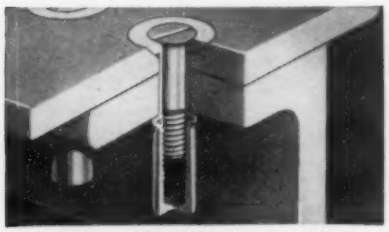
What's new? What's needed? What's tomorrow's problem? Why not call in B. F. Goodrich research and engineering facilities. Phone or write: *The B. F. Goodrich Company, Aeronautical Sales, Akron, Ohio.*

BFG Fuel and Oil Cells—provide strength with flexibility.



BFG Pressure Sealing Zippers—make airtight, water-tight seal.

BFG Avtrim—looks like a carpet, cleans like a dish.



BFG Rivnuts—the only one-piece blind rivet with threads.

BFG Adhesives, Hose, Matting, etc.—meet any need for rubber.

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PRODUCTS FOR AVIATION

RESEARCH KEEPS B.F.Goodrich FIRST IN RUBBER

DOW CORNING CORPORATION

Silicone News

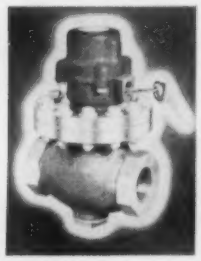
FOR DESIGN ENGINEERS

Silicone Insulation Expands Market for Electric Valves

You can open new markets for electric machines and electronic devices simply by offering units insulated with Dow Corning silicones. That's been the experience of many manufacturers including the Atkomatic Valve Co., Inc., of Indianapolis.

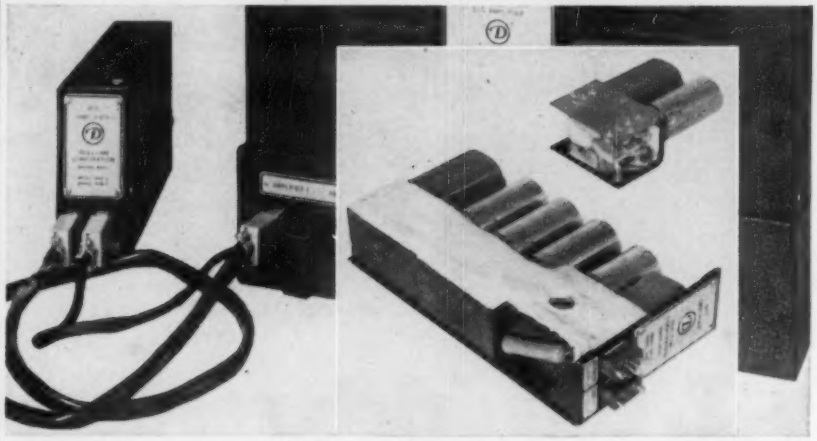
The solenoid operated valves manufactured by Atkomatic have always been popular for use in inaccessible locations because of their fast, hammerless operation and remote controllability. Their application has been somewhat restricted, however, by the operating temperature limits of 180 F imposed by the organic insulating materials in the solenoid coils.

Atkomatic designers removed that temperature limitation and at the same time expanded their markets by developing a special series of solenoid coils insulated with heat-stable silicones. Capable of operating to 450 F, the silicone insulated coils can be used on valves exposed to the most rugged high pressure steam service. They open up an important new market by making it possible to use solenoid operated valves in automatic control systems for general space heating and for production lines handling hot liquids. *No. 48*



Silicone products most widely used, are indexed by type of application, in the 1955 Reference Guide to Dow Corning Silicone Products. A brief but comprehensive 8-page summary is given of the properties and applications. With increasing effort devoted to product improvement and cost reduction, such a reference guide to this remarkably stable group of engineering materials becomes increasingly important to design, production and maintenance engineers. *No. 49*

Temperature stable pressure sensitive silicone adhesives that stick to almost any material, can be applied and retain useful bond strength at temperatures from —100 to 500 F. Uses include bonding silicone treated electrical insulating materials and as a temporary bond to facilitate assembly of small parts prior to mechanical installation. *No. 50*



Sensitive Amplifier Made Practical With RTV Silastic Used As Potting Compound

Adequate protection of delicate electronic devices requires a potting compound that has a unique combination of properties. Doelcam Division of Minneapolis Honeywell, Boston, found RTV Silastic* to be the only material with all of the essential properties for potting a very sensitive amplifier.

The problem was to design for the National Bureau of Standards a highly sensitive d-c amplifier that would require minimum space; withstand hard service and still amplify signals as low as 6×10^{-4} volts to a full scale output of 100 volts.

This amplifier was so delicate that merely breathing on exposed vacuum tube terminals when the amplifier was cold caused intolerable outputs. It was necessary to protect the circuitry against moisture; avoid new leakage paths; provide a cushion to eliminate drift errors in the amplifier output. Conventional potting compounds were not practical because they exerted enough pressure on curing to alter the relative positions of the components and change circuit values.

Success of the new unit, therefore, depended upon finding a potting compound which would flow gently into place; cure at room temperatures; exert negligible pressure on components; and exclude moisture. Good dielectric properties, inertness, resistance to fungus growth and the ability to absorb shock and the expansion and contraction of metals were other requirements.

After testing a wide variety of potting compounds, Doelcam found that RTV Silastic in the fluid consistency was the only material with all of the properties required. Leakage current at 500 volts, for example, registered less than 2×10^{-9} amps through a cubic centimeter of cured RTV Silastic. This was below the noise level of the measuring instrument. Even when wires with a 1/32 inch coating of RTV were dipped into salt water, this value remained unchanged. *No. 47*

* T.M. REG. DOW CORNING CORPORATION

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RESEARCH AND MARKETING

Irina Nelidow, Mary Whitney Fenton, Mildred Raba.

BuAer Shakeup Streamlines Operations..... 12
▶ New procurement organization to speed contracting, improve Navy's phasing of weapon systems components.

USAF Wants Industry Help in Research Costs..... 14
▶ Adequacy of nation's research and development program holds important position in Pentagon budget review.

Ground Tests Spur C-133, B-66 Production..... 28
▶ New Douglas laboratory equipped to ground test and prove out aircraft to shorten actual flight-test time.

AERONAUTICAL ENGINEERING
Seamew Makes First Carrier Flight.... 35
Handling of Drawings Streamlined.... 40

AVIONICS
Radar Simulates Aerial Warfare..... 63
Kaiser Given Control over Avionics.... 40
Blind Flight Instruments for Copters.. 65
Blimps Get GE High-Power Radar..... 67
Filter Center 67

PRODUCTION
Martin Automates Precision Miller.... 46
Production Briefing 45

MANAGEMENT
B-47s Win SAC Meet..... 16
Hoover Commission Scores British.... 18
British Reply to Hoover Commission... 18
U. S. Aircraft Exports Lead World..... 21
The B-52 Joins the Air Force..... 22
Small Business Gets Defense Awards.. 40
News Digest 7
Who's Where 9
Industry Observer 9
Washington Roundup 11

AIR TRANSPORT
Canadians Trade Routes..... 21
CAB Asks Equal Pay on Latin Routes.. 25
Florida Nonskeds Reinstated by CAA.. 25
CAA Airways Program Expands Services 65
Freight Forwarder Rules Eased..... 16
Examiner Shuffles North-South Routes.. 95
D-C-8 to Best DC-7 in Flying Cost..... 96
Australian Earnings Set Record..... 96
TWA Hopes to Double Tourists..... 97

FINANCIAL
Navy, USAF Contracts' Fund..... 15
Lobbyists Show Low Expenses..... 25
French End Gas Tax..... 27
Certificate of Necessity for UAC..... 40
USAF Contracts 48
Army Contracts 54
Navy Contracts 54

AVIATION SAFETY
Pilot Off Course, Hits Mountain..... 79
Safety Men Shifted..... 27

EQUIPMENT
New Aviation Products..... 89
Also on the Market..... 91

Calendar 8
Letters 69

EDITORIAL
Quarles Choice Is Significant.....110
General Boatner Retires.....110

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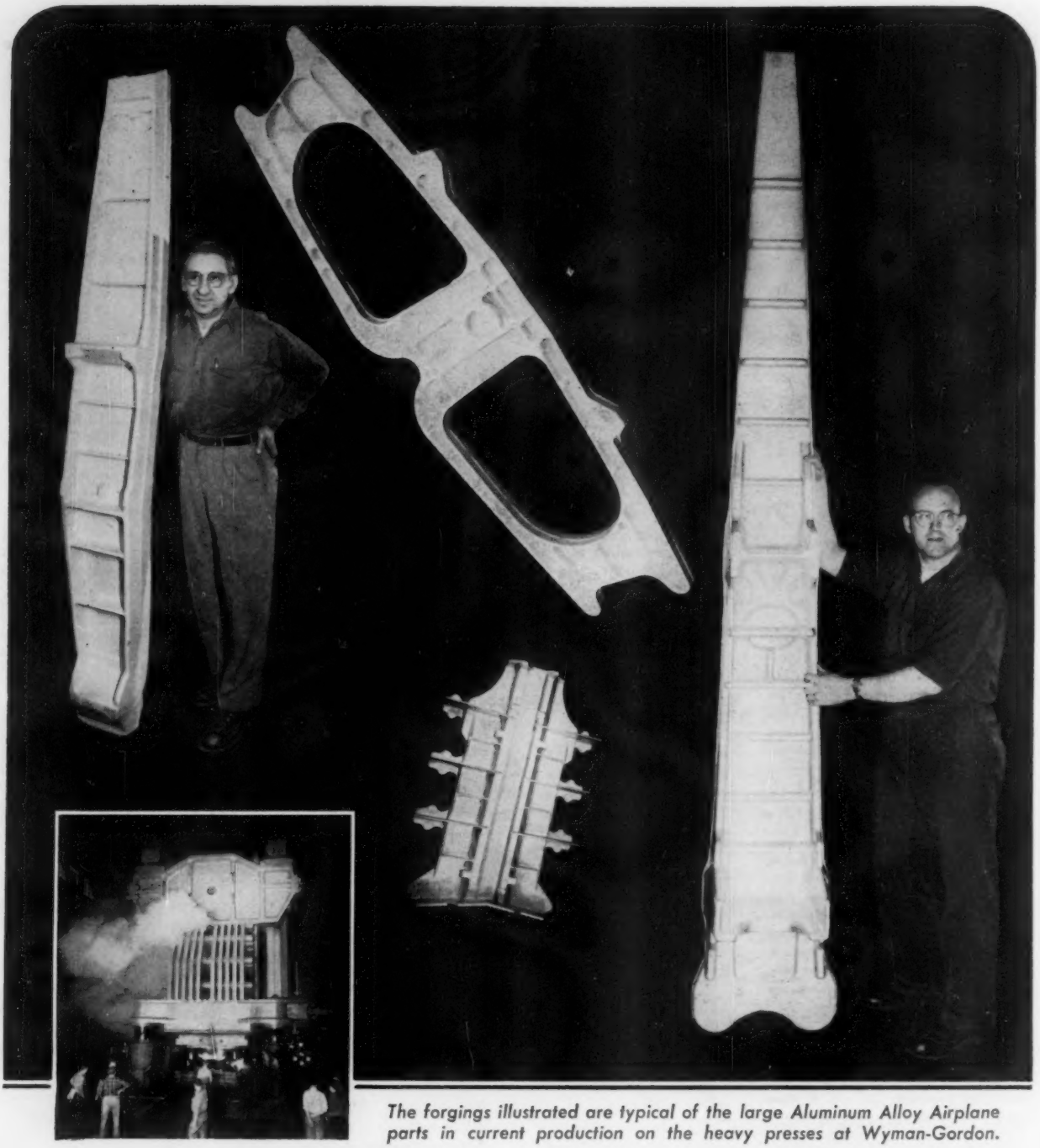

The forgings illustrated are typical of the large Aluminum Alloy Airplane parts in current production on the heavy presses at Wyman-Gordon.

A new era in the art of forging has been demonstrated as production goes forward on this 35,000-ton closed die forging press. Larger forgings with thinner sections and closer tolerances than heretofore possible open new concepts in forging design. Wyman-Gordon continues to pioneer by — Keeping Ahead of Progress.

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NEWS DIGEST

XV-3 CONVERTIPLANE starts its first flight at Bell Aircraft Corp.'s Fort Worth Plant. After its vertical takeoff, the Army's new aircraft completed only helicopter maneuvers and did not make the transition to normal horizontal flight by tilting its rotor-propellers.

Domestic

Republic Aviation Corp. will cut its work force at the Farmingdale, N. Y., plant to 17,000 on Sept. 16 to adjust for tapering production of the RF-84F, photo-reconnaissance version of the F-84F Thunderstreak fighter-bomber. The layoff will affect approximately 2,500 employes. The last RF-84Fs now are entering production, and contracts for the aircraft will be completed next June. Thunderstreak output will continue until late 1957, when production of the F-105 fighter-bomber is expected to be under way. Republic's present backlog totals more than $600 million.

Out-of-sight target drone, Beech Air-Craft Corp.'s XKDB-1, won the Navy's competition for a new pilotless remote-controlled aircraft. Deliveries of the all-metal high-wing monoplane, to be used for training ship-to-air and air-to-air weapon systems crews, are expected within a year. The recoverable drone is designed for catapult launchings and can be adapted for air drops. It has a wing span of 12 ft. 6 in., length of 13 ft. 6 in., gross weight of less than 600 lb., and is powered by a six-cylinder two-cycle engine.

Eastern Air Lines ordered 10 1049G Super Constellations from Lockheed Aircraft Corp. Deliveries on the $25-million purchase will begin September 1956 at a rate of three transports a month. The new 1049Gs will give EAL a fleet of 61 Constellation-type aircraft. Eastern earlier increased its DC-7B orders with Douglas Aircraft Co. to a total of 40 transports and announced a program to spend $200 million on turboprop and turbojet airliners (AW Aug. 8, p. 7).

Lt. Col. John P. Stapp of the Air Research and Development Command has won USAF's 1954 Cheney Award for his experimental rides on a high-speed rocket sled to test human limitations in rapid deceleration.

Ryan Aeronautical Co. has been awarded more than $5 million in new subcontracts for airframe parts and jet engines components. Included in the subcontracts were orders from North American Aviation, Ford Motor Co.'s Aircraft Engine Division, Pratt & Whitney Aircraft and the Wright Aeronautical Division of Curtiss-Wright Corp.

Convair YC-131C completed a 2,400-mile flight from Seattle to Kelly AFB, Tex., a new nonstop distance record for the USAF turboprop transport. The YC-131C is powered by two Allison YT56-A3 engines.

Rheem Manufacturing Co.'s Government Products Division received a $6-million subcontract from North American Aviation for production of F-100 control surfaces. The order calls for external slots and flaps, inboard and outboard ailerons, rudders, vertical and horizontal stabilizers and wingtips.

Harry T. Rowland, 56, president of Hayes Aircraft Corp. and former executive vice president of the Glenn L. Martin Co., died Aug. 28 in Birmingham, Ala.

Financial

United Aircraft Corp. declared a dividend of one share of common stock for each two held, payable Sept. 26 to holders of record on Sept. 9. A cash dividend of 75 cents on the increased common will be paid Dec. 10 to stockholders of record Nov. 18.

Los Angeles Airways reported net earnings of $41,408 for the first six months of 1955 from revenues totaling $635,215. Operating expenses for the period amounted to $97,324.

Chance Vought Aircraft declared a 40-cent dividend on common shares, payable Sept. 26 to stockholders of record Sept. 9.

International

Comet III jet transport will begin tropical trials in South Africa at the end of this year as part of a series of tests scheduled by de Havilland Aircraft Co. to aid development of the new Comet IV. The British company is incorporating and testing on the Mark III all modifications recommended after the investigation of the Comet I crashes last year.

British aircraft exports totaled $85,940,509 during the first half of 1955, an increase of approximately $273,560 over the same period last year.

as others see us . . .

A user tells how AETCO SERVICE helped him

by E. D. HOLLAND
Hydraulic Engineer
OZONE METAL PRODUCTS CO.

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AVIATION CALENDAR

Sept. 12-15—American Meteorological Society's 139th National Meeting and Fifth Weather Radar Conference of Army Signal Corps., Fort Monmouth, N. J.

Sept. 12-16—Instrument Society of America, Instrument-Automation Conference and Exhibit, Shrine Exposition Hall and Auditorium, Los Angeles.

Sept. 17—Institute of Radio Engineers, Symposium on Automation, Cedar Rapids.

Sept. 17-18—Antique Airplane Assn. Convention and Fly-In, Ottumwa, Iowa.

Sept. 19-21—American Rocket Society, Western Fall Meeting, Los Angeles.

Sept. 21—Southwest Airmotive Engine Forum, sponsored by Pratt & Whitney and Bendix, Melrose Hotel, Dallas.

Sept. 21-22—American Helicopter Society, second West Coast Forum, Hollywood-Roosevelt Hotel, Hollywood, Calif.

Sept. 28-29—American Institute of Electrical Engineers and Institute of Radio Engineers, Park Sheraton Hotel, Detroit.

Sept. 29-30—Radio Technical Commission for Aeronautics, fall assembly, Hotel Statler, Washington, D. C.

Oct. 3-5—Eleventh National Electronics Conference, Hotel Sherman, Chicago.

Oct. 4-6—Eleventh annual Aircraft Spark Plug and Ignition Conference, sponsored by Champion Spark Plug Co., Secor Hotel, Toledo, Ohio.

Oct. 5-7—National Business Aircraft Assn., eighth annual Meeting and Forum, Sheraton-Cadillac Hotel, Detroit.

Oct. 5-7—1955 National Airports Conference, sponsored by American Association of Airport Executives and University of Oklahoma, Norman, Okla.

Oct. 5-9—World Plastics Fair and Exposition, National Guard Armory, Los Angeles.

Oct. 7—Escape from High Performance Aircraft Symposium, sponsored by Institute of Transportation & Traffic Engineering Ext. at U.C.L.A., Aeromedical-Engineering Assn., Institute of the Aeronautical Sciences, IAS Building, Los Angeles.

Oct. 11-15—Society of Automotive Engineers, Golden Anniversary Aeronautic Meeting, Aircraft Production Forum and Aircraft Engineering Display, Hotel Statler, Los Angeles.

Oct. 18-19—Seventh annual Aerial Dusting and Spraying Conference, sponsored by the Washington State Aeronautics Commission and the State College of Washington, Wenatchee, Wash.

Oct. 17-21—National Safety Council, 43rd National Congress and Exposition, La Salle and Conrad Hilton Hotels, Chicago.

Oct. 17-21—International Air Transport Assn., 11th annual general meeting, Waldorf-Astoria Hotel, New York.

Oct. 20-21—Sixth annual National Noise Abatement Symposium, Armour Research Foundation, Chicago.

Oct. 24-25—Institute of Radio Engineers' Professional Group on Electron Devices, first annual Technical Meeting, Shoreham Hotel, Washington, D. C.

Oct. 26-28—Southeastern Airport Managers' Assn., annual meeting, Greenville, S. C.

Oct. 31-Nov. 1—Institute of Radio Engineers, 1955 East Coast Conference on Aeronautical and Navigational Electronics, Lord Baltimore Hotel, Baltimore.

ANGLgear reduces cost

ANGLgear, standardized right-angle bevel gear drive, will save you the extra cost of custom-made take-offs. Compact design, light weight, and dependable performance make ANGLgear a favorite for aviation applications. In the following models:

Model & Type	HP	RPM	Ultimate Static Torque (in lb)	Wt
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R-310 3-way	½	1800	450	½ lb
R-320 2-way	1	1800	1500	2¼ lb
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For full information on ANGLgear, write for our new Aviation Catalog.

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WHO'S WHERE

In the Front Office

Gwilyn A. Price, chairman of board and president, Westinghouse Electric Corp. Other new officers: **Mark W. Cresap, Jr.,** executive vice president and deputy chief executive officer; **Latham E. Osborne,** vice chairman of the board; **John K. Hodnette,** vice president and general manager.

Roy J. Bennecchi, vice president, Lear, Inc.

W. V. Neisius, vice president of applications and sales, Logistics Research Inc. Also promoted: **A. Y. Baker,** vice president of development and production.

R. J. Arft, vice president and assistant to the president, Servel, Inc.; **William F. Lange,** assistant to the vice president and general manager, defense division.

Edward F. Norman, vice president of operations, United States Overseas Airlines.

Frank Lynott, vice president of freight operations, Flying Tiger Line; **John Higgins,** assistant vice president of sales; **Walter S. Burns,** Chicago station manager.

William J. Mitchell, vice president of traffic and sales, Bonanza Air Lines; **R. H. Herrnstein,** vice president of finance.

Honors and Elections

Maj. Gen. Lucas V. Beau (USAF), national commander of the Civil Air Patrol, named recipient of the 1955 Hoyt S. Vandenberg Memorial Trophy by the Air Force Association.

C. J. Underwood, export manager of Consolidated Engineering Corp., appointed to a United States Trade Mission for International Trade Fairs.

Dr. Theodore von Karman, chairman of Advisory Group for Aeronautical Research and Development of the North Atlantic Treaty Organization and chairman emeritus of the Scientific Advisory Board to the Chief of Staff, USAF, honored by the presentation of a sculptured likeness to the Western Region headquarters of the Institute of the Aeronautical Sciences in Los Angeles.

Changes

B. W. Dudley, general manager of the propeller division, Curtiss-Wright Corp.

Arthur Wilson Winship, Jr., Cincinnati manager, Emery Air Freight Corp.; **Robert K. Uniacke,** sales representative.

Warren C. Wilson, advertising and public relations manager, Servomechanisms, Inc.

Robert E. Wagenhals, manager of Sales Forecast Department, Timken Roller Bearing Co.

Jeff D. Montgomery, West Coast engineering manager, Andrew California Corp.

Vernon D. Enwald, Midwest regional manager, Warner Electric Brake & Clutch Co.

H. J. Buttner, manager of engineering, Le Roi Division of Westinghouse Air Brake Co.

Rupert R. Westrup, sales manager, Monogram Manufacturing Co.

INDUSTRY OBSERVER

► United Airlines engineering group in its evaluation of the Boeing and Douglas jet transports favors the DC-8. Such factors as price and delivery dates, however, have not been included in their analysis and could influence United's decision.

► **Airlines shortly will have an opportunity to buy military Tacan receivers (ARN-21) from Federal Telephone and Radio Co. with first deliveries in early 1956. FTR, a sister company of Federal Telecommunications Laboratories, also plans to market a new light plane automatic pilot developed by Ansco Division of General Aniline & Film Corp.**

► French naval air force is scheduled to receive during 1955-1956: five Breguet 1050 carrier anti-submarine aircraft, two Hurel-Dubois HD35 anti-sub aircraft, 20 SE3130 Alouette II helicopters, 10 Fouga CM170R Magister trainers, 30 Morane-Saulnier MS733 trainers, 50 Breguet 1070 carrier-based aircraft.

► **McDonnell Aircraft is developing an F4H from the F3H. The new plane will be a two-seater, have a new engine and new armament. It will not be equipped with guns.**

► New optical theodolite for tracking missiles, which automatically and instantly converts information on missile position into punched card or tape data, eliminating present time-consuming process of analyzing each frame of a movie film, will soon undergo evaluation at Navy's Point Mugu missile center. New device, called Radott, (Recording Angular Data Optical Tracking Theodolite), developed by H. A. Wagner Co. of Van Nuys, Calif., requires only one operator instead of two needed for present theodolites.

► **Business is booming for avionics firms that build equipment for airlines and business aircraft. One manufacturer reports its commercial avionics business for business aircraft is double that of last year.**

► Hughes Aircraft has merged its Falcon air-to-air-missile and its interceptor fire control research and development groups into a single weapon systems group, reflecting the close inter-relation between an interceptor's fire control system and the missiles it fires.

► **One of the Convair F-102As now flying (AW Aug. 29, p. 14) is fitted with a rearward sighted camera to record the action of its Falcon-firing armament system, a tray similar to that used by North American on the F-100.**

► Maximum design flexure of Boeing B-52 wing is 32 ft. Directional apportionment of this flexing is 22 ft. up and 10 ft. down.

► **Convair's B-58 Hustler project is progressing satisfactorily. First General Electric J79 engine was delivered to the Ft. Worth, Tex., plant recently.**

► Boeing sources say the hottest prospects for jet transport orders at the moment are Pan American World Airways, United Air Lines and American Airlines.

► **Navy is evaluating "cue" training system as a timesaver in teaching landing techniques at Pensacola, Fla. Developed by Human Engineering Dept. of Navy's Special Devices Center, system is based on the fact that shape of runway and distance to horizon are generally the same regardless of airport. The ground cue trainers teach students to recognize how these standard features ought to appear during approach, simplifying their job when they advance to actual flight training. Initial tests have shown landing instruction time can be cut up to 70% with cue trainers.**

► Pre-production model of the Turbomeca Artouste-powered SE 3130 Alouette II helicopter flew last month in France. Sncase has an order for three pre-production models of this aircraft and a production order for another 100 is planned.

24 Houris...1 Hostage

One by one, the veiled women boarded the plane, bound for the old world after a glimpse of the new. The sheik was still in Washington, attending a diplomatic dinner. He would leave tomorrow — tonight, he was sending his harem home.

But not unguarded. A stout, turbaned officer shepherded them aboard, then motioned politely to the Airwork representative to precede him into the plane.

It was a special service flight for the Airwork man. He had just supervised the engine overhaul of the sheik's plane and was now making the flight to instruct the native mechanics who would care for it in the desert.

Once inside the plane, the guard loosened the automatic in his holster significantly. As the plane took off, he observed, "If these engines sputter, you will be the first to die." His tone was matter-of-fact, yet firm. The Airwork man swallowed hard, but said nothing. What *could* he say?

The rest of the story is anticlimax. The engines functioned perfectly — the flight was without further incident, thanks to Airwork's high standards of overhaul, ensuring factory-new performance. Airwork production line techniques are equal to those of the original manufacturer.

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Washington Roundup

Budget Review

Day and night sessions of top echelon Air Force executives last week followed reports that Treasury Secretary George M. Humphrey has ordered a new effort to cut Fiscal 1956 expenditures so as to face the electorate with a balanced budget in the next election. Rumors were plentiful in the Pentagon as USAF went through three "exercises" to demonstrate how alternate plans for economy will affect its operations. Estimates of the amount sought from USAF planned spending ranged from $900 million to $1.6 billion.

Despite Defense Secretary Charles E. Wilson's previous record as an adherent of the Humphrey philosophy of economy, there are Pentagon observers who believe that Secretary Wilson will take a stand this time and possibly a firm one. Reason: He is committed on Capitol Hill to a program that will keep U. S. air power ahead of the fast-moving Russians. In the face of rapid Soviet advances, Congress already has approved stepped-up production of long range bombers and some fighter planes.

Wilson, fast becoming educated to the perils of crossing a congressman, particularly a Democrat congressman with an abiding interest in air power and experienced in investigative techniques, may put this vested interest above that of the Republican Party's next presidential campaign.

Said a spokesman for the Defense Department Comptroller's Office: "The airplanes that we want and that we had previously told Congress we planned to get, we are going to get them and we hope to get them as far (sic) as we said."

Low Fare Troubles?

Trans World Airlines, American Airlines and United Air Lines may have stirred up some trouble for themselves with their new $80 fares for transcontinental coach service.

Low-fare partisans in the airline industry are presently pointing to coach fares to the interior cities of the U. S. and asking why they haven't been cut, too. In most cases, the standard $99 coach fare is a lower per-mile rate than coach fares on other segments.

Low fares are a popular talking point with Congressmen, and it looks as if legislators from the states between the coasts might be inspired to put pressure on the Civil Aeronautics Board for universal fare cuts when they come back to Washington in January.

Trans-Atlantic Mail Rate

Civil Aeronautics Board has upheld important precedents set in dealing with the trans-Atlantic final mail rate case last December. Pan American World Airways and Trans World Airlines both objected to the CAB findings and asked for reconsideration.

In rejecting the major contentions of PAA and TWA, the Board made some minor adjustments in the mail rates for past and future periods but remained firm on its policy decision.

In its previous December decision, the CAB refused to underwrite strike losses, cut the rate of return on investment and applied income from investment and other non-operational income to offset subsidy. The decision also put the carriers on a uniform rate where their operations are comparable and cut off extra subsidy for PanAm's current operation of the Boeing Stratocruiser.

New Look at BuAer

Part of the new look at Navy's Bureau of Aeronautics, where Rear Admiral James S. Russell is reorganizing things to make life easier for the aircraft industry's contract administrators (see p. 12) will be a waiting receptionist.

Visitors to BuAer's Constitution Avenue home have for years been wandering around the building, foot-weary from the search for the right office, not always received with cordiality when they located the overworked specialist.

Some time soon there will be a new lobby desk, staffed by the kind of personnel found at the entrance of modern offices and manufacturing plants.

Profits Report Due

First report of the Senate Preparedness Investigating Subcommittee, headed by Sen. Lyndon Johnson (D.-Tex.), is expected to deal with profits of airframe manufactures.

It is due out this week. House Appropriations Committee and House Armed Services Investigating Subcommittee are also investigating industry profits, but they do not expect any public developments before next year.

CAA Changes

It will be an entirely revolutionary idea within the Civil Aeronautics Administration, but in the future there is to be less reliance on work by committee and more emphasis on direct exercise of responsibility by department heads.

This change of system, which is slowly taking place, in no way precludes an eventual reorganization of the 16,000-employe agency.

CAA's operation by committee is partially due to that system's popularity within government—there are a total of 4,800 committees and subcommitees in existence in the Department of Commerce alone—but committee work has too often been used in CAA as a device for avoiding decisive action as well as ultimate responsibility.

Change in CAA's attitude, including a switch to a more positive rather than the negative approach, is being directed from the office of Under Secretary for Transportation Louis Rothschild. As a prelude to the coming shake-up, Commerce officials are being taken on extensive field trips of CAA regional offices. There is also a noticeable effort to effect greater co-ordination and cooperation between CAA and the military, which it is hoped will result in improved congressional relations on all future appropriation requests of joint interest.

—Washington staff

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BuAer Shakeup Streamlines Operations

New procurement unit will soon speed contracting, improve phasing of weapon systems components.

By Claude Witze

Washington, D. C.—U. S. Navy's Bureau of Aeronautics is being reorganized and expanded to cope more efficiently with the complexity of modern weapon systems.

A major purpose of the changes, Rear Admiral James S. Russell, BuAer chief, told AVIATION WEEK, is to improve procurement procedures with aircraft and component manufacturers.

This will be accomplished through new emphasis on the contracts division, where the staff will be increased and methods revised to speed processing of agreements with industry.

BuAer's reorganization abolishes the present post of Assistant Chief for Materiel & Services and the former Plans Co-ordination Division that operated under the Deputy Bureau Chief. These new offices are formed:

- **An Assistant Chief for Procurement,** who will place new stress on the importance of BuAer's business activity. He will be concerned with contracting, industrial planning, production and quality control. Until about Oct. 1 the job will be filled by Capt. D. M. Wisehaupt. Then it will be taken over by Rear Admiral George F. Beardsley.
- **An Assistant Chief for Field Activities,** who will seek better support of fleet activities at the Navy's shore air stations. This group will be responsible for overhaul, repair and maintenance of aircraft, supply and the operation of shore establishments. It will design and purchase aerological and photographic equipment for the Navy and Marines. Heading the group will be Rear Admiral Carl J. Pfingstag.
- **An Assistant Chief for Plans and Programs,** replacing the former Plans Co-ordination Division. This office will have increased responsibilities for proper phasing of weapon systems components. A primary mission will be the task of meeting Navy operational requirements with advanced technical developments. Acting Assistant Chief in charge of this program is Capt. Henry T. Dietrich, former head of the Plans Co-ordination Division.

Rear Admiral James S. Russell, Bureau of Aeronautics chief since March, was graduated from the Naval Academy in 1926. He has been a Naval aviator since 1929 and has had a distinguished career as a flier and carrier division commander. He was director of the atomic bomb tests at Eniwetok in 1947 and 1948. In 1953, he was director of the Air Warfare Division, Office of the Chief of Naval Operations.

Goal: Speed Fleet Use

There has been no change in the Research and Development Group, except that another rear admiral, Robert E. Dixon, has been assigned to head the office as an Assistant Chief of the Bureau. As a captain, Dixon headed the Aircraft Division. In his new R & D post he replaces Admiral Pfingstag, who also received his flag rank recently.

"Top aim of this program," Admiral Russell said, "is to get higher output from each person on the BuAer staff and at the same time get a better co-ordinated output. Careful study of BuAer's history shows that it has not expanded as the burden of work increased. This is one of the few shops in Washington where we have started work at 7 A. M. in an effort to keep up with the job. At one time the staff worked on Saturdays."

Admiral Russell said BuAer's staff has high standards of ability and morale but has been badly overworked. He added that the aircraft industry, particularly in the field of contracting, has suffered to some extent in the past.

The former Plans Co-ordination Division, he said, was too small to keep abreast of the growing complexity of modern aircraft and missiles, and the first step had to be elevation of this work to place it under direct control of an Assistant Chief. In the future, this office will be responsible for the proper timing of component development and production, keeping the entire weapon systems in phase to speed its development and production for use by the fleet.

Admiral Russell emphasized that he did not feel BuAer was falling down on the job in the past, but "it was straining hard to keep pace with developments and the growing burden of contractual work."

Efficient Contract Handling

"In the future," he said, "we hope to apply better talent to our problems and apply it earlier. This will insure that the work at shore bases on maintenance, training and special equipment will keep pace. There will be fewer problems for the Navy and fewer for the contractors."

In this connection, Admiral Russell placed special stress on Admiral Beardsley's new post as head of the Procurement Group. Contractors, he said, will get faster answers to their questions and more efficient handling of contract problems. He aims to overcome such

Navy's FIRM Plan

U. S. Navy's "Murphy Plan"—BuAer's version of the USAF Cook-Craigie procedure—has been renamed since it was put into active operation as a prelude to full-scale production of new aircraft.

It is known as "FIRM"—Fleet Introduction of Replacement Models. In effect, it is an accelerated service test, a fast proving ground run of a new model to uncover as many "bugs" as possible before deliveries to the fleet.

To BuAer, it is the practical application of the "fly before you buy" philosophy, aimed at saving money, time and lives.

situations as the one which existed last year, when BuAer gave $165 million of research and development contracts, but $29 million of them were not in proper contract form at the year's end.

On the broader subject of BuAer procurement policy, Admiral Russell said in effect that the Navy is buying the same kind of hardware that is sold to the Air Force and that he intends to push closer co-ordination between the services wherever possible.

'The Minuet'

"BuAer," he said, "wants a high birth rate for new ideas and prototypes. It wants a high rate of infanticide to select the best model for the fleet and to have fewer models in the fleet to reduce the logistics and training problems."

He indicated that BuAer will take a flexible course in accepting a new aircraft.

While USAF has now abolished the design study as a slow and wasteful procedure, the Navy will continue to use the "paper study" in some cases.

Admiral Russell calls it "the minuet." This is the early stage when a number of contractors "show off their steps" to BuAer, after which there is some paper work and a contract awarded, usually calling for an experimental type plane.

He cites the Chance Vought F8U as an example of a good plane resulting from "the minuet."

A second procurement procedure used by BuAer on new weapons systems is closer to the new USAF philosophy of procurement.

A contractor of proven competence, with a record for know-how and production capacity available, can sell a good idea to the Navy. An example of this is the Douglas A4D Skyhawk. A small attack plane, crammed with new engineering ideas, the A4D marked a radical departure from the trend toward larger, more complex and more expensive aircraft.

Obtain Additional Space

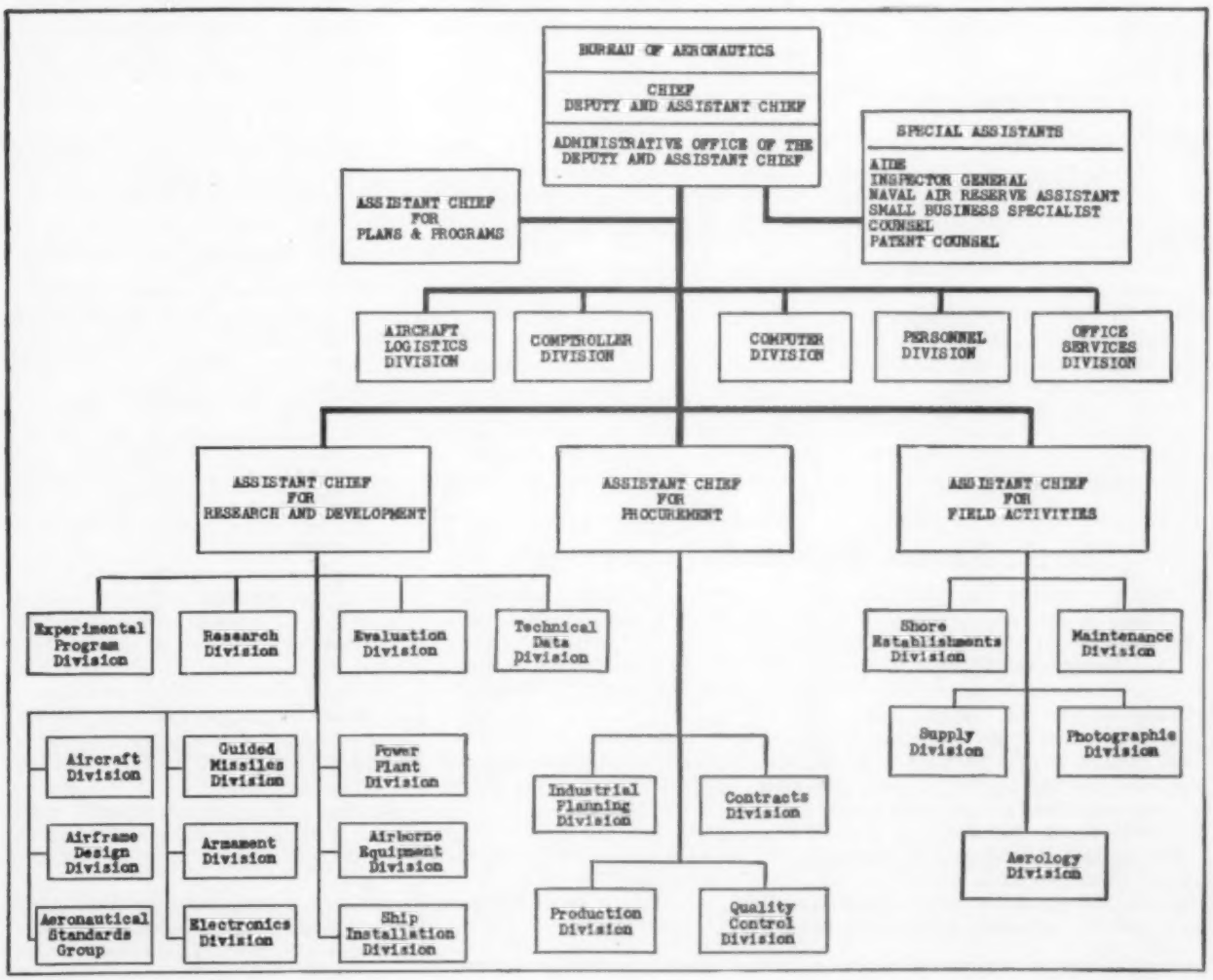
Both Douglas and BuAer won commendation for its development. Success in this case, the admiral indicated, has made his office partial to this kind of an arrangement for weapons development when it is possible. For speedy development at minimum cost to both the manufacturer and the government, the system is close to that recently adopted by USAF.

Admiral Russell said that the Navy, like USAF, is viewing contractor performance with a close eye. BuAer favors a firm, fair contract, with a fixed price if they can get it. Incentive type contracts also are favored, but performance and quality must be guaranteed.

Admiral Beardsley, BuAer's new Assistant Chief for Procurement, is coming to Washington this month from the Naval Air Station at Alameda, Calif., where he was Aviation Engineer.

He has served BuAer in the past as Director of the Production Division and Director of the Fiscal Division.

Discussing the new program with AVIATION WEEK, Admiral Russell said the reorganization ultimately will add about 10% to BuAer's personnel. In a rejuggling of space in the Navy's crowded Constitution Avenue quarters, he is taking over nearly 93,000 sq. ft. of space in the Munitions Building, adjoining the main Navy building. Giving up room in other parts of Washington to consolidate the operation, BuAer will come out with a net gain of more than 41,000 sq. ft.



USAF Urges Aircraft Industry To Use Own Funds for Research

Washington, D. C.—In the midst of a searching budget review under way in U. S. Air Force offices at the Pentagon last week, the question of the adequacy of the nation's research and development effort continued to hold an important position.

Earlier optimism that Donald A. Quarles, new USAF Secretary, would make a strong effort to increase the Air Force's R & D funds was dimmed by this development:

In a speech at the General Electric plant in Schenectady, N. Y., Quarles said: " . . . The research and development program of the federal government . . . amounts to more than $2 billion a year. About 85% of this is for national security including defense and the military-related programs of the Atomic Energy Commisison and the National Advisory Committee for Aeronautics. This federal effort absorbs more than half the R & D activity of the country. . . . It raises a question whether the government is not already taking about as large a cut out of the R & D pool as would be sound and wise for a steady program."

Industry Discussions

Meanwhile, Trevor Gardner, Assistant Air Force Secretary for Research and Development, prepared to push his program to encourage manufacturers of aircraft and related components to invest more of their own money in research. He told AVIATION WEEK he is setting up a special USAF team to tour major aircraft plants and discuss the problem with top executives.

Gardner gave his first blunt lecture on the subject at the Air Force Assn. convention in San Francisco last month (AW Aug. 22, p 12). He said another $100 to $200 million is needed in Fiscal 1956 to exploit recent scientific breakthroughs. Gardner feels strongly that—even if these funds are obtained—he will have achieved only half his goal.

The other half he defines as "a mature industry with confidence in its own future, willing to invest substantial sums exploring new fields that must be exploited for tomorrow's product."

Natural reticence of the industry to make heavy R & D expenditures probably is due to the fact that a substantial number of them have little or no commercial business. At the same time, they have a government backlog of more than $10 billion and operate on a narrow margin of capital.

Must Speed Progress

Gardner said five major airframe companies with total 1954 sales of $3.7 billion spent only $1.4 million of their own money on R & D. Most of this was on in-shop programs aimed at product improvement, an activity that cost $5.3 million in total, but the Air Force met $3.9 million of the bill in overhead and production contracts.

Major reason for Gardner's dissatisfaction with this picture is his conviction that technological progress must be speeded and that USAF and all the other federal agencies cannot supply the necessary money.

He told AVIATION WEEK that the next five years of technical progress in weapons system development must be twice that of the last 50 years, the period in which aviation moved from the Wright Brothers to the achievement of Mach 1. He pointed out that the chemical industry, for example, has progressed faster than aviation and cited the expenditure of $73 million on R & D by du Pont in 1954.

Strong evidence exists that, to be successful, an aircraft company must give ground—which means more money to R & D—if it is to survive future USAF competitions. With the elimination of design studies, more emphasis is being placed on the production of new ideas, and their appearance in a mockup built under a Phase I contract.

If a basic research problem must be solved to achieve a goal, the manufacturer now has more incentive to finance the work.

Security Troubles

This may have to be done despite the fact that there is no profit in R & D and that the instability of military orders may continue to result in widely fluctuating sales curves. Unlike the case of Boeing's investment of $15 million in the KC-135 jet tanker, R & D money spent on weapons systems for the most part will have no direct commercial application.

Another major problem in this field is that of security.

Gardner told AVIATION WEEK he has found one company willing to start a new R & D program with $25 million if USAF will disclose all its secrets so that the money can be channeled into the most effective fields of research.

Another company—this one in the steel industry—has offered to build a laboratory and start its activity with a $10 million fund if USAF will put up another $10 million, lift security wraps and reach a satisfactory agreement on proprietory rights to the technical results.

Gardner, who describes U. S. technical objectives as "fabulous," sees merit in this idea but is handicapped by the

Army Spurs R & D

The U. S. Army has joined the U. S. Air Force in putting new emphasis on research and development. It has ordered the "highest possible priority" on the search for new weapons and named a new director of R & D.

He is William H. Martin, shifted from his old post as Deputy Assistant Secretary of Defense for Applications Engineering. In making the appointment, Army Secretary Wilber M. Brucker said Martin will have the same responsibility as an Assistant Secretary and will report to Brucker.

Martin is a former vice president of Bell Laboratories. His shift follows recommendations of a Hoover Commission task force that was headed by Mervin J. Kelly, Bell Laboratories president.

Martin Forms Research Laboratory

Glenn L. Martin Co., Baltimore, Md., has set up a Research Institute for Advanced Science as a subsidiary of its weapons system business. Studies in the field of gravity are high on the laboratory's agenda.

Announcing establishment of RIAS at a time when Air Force officials are urging the aircraft industry to spend more of its own money on basic research, Welcome W. Bender, the laboratory manager, said:

"It is our aim to gather together the most highly skilled scientists we can attract and create an energetic environment in which they may explore both theoretically and experimentally the frontiers of man's knowledge. We will insist that they not be constrained to develop products or to help on our production line problems."

Bender told the Babson Gravity Research Foundation at New Boston, N. H., that there will be no frontal attack on negating gravity, but RIAS will concentrate the best talent on the subject in an effort to fill existing gaps in man's knowledge of the subject. He said RIAS already has contracts with more than a dozen European scientists who are making studies of gravity.

security rules. A program of this type, accepted by a large number of firms, would double the effectiveness of USAF's limited R & D budget.

Industry attitude on the security problem appears to be that an easing of the regulations would spur R & D by the manufacturers when the results had commercial application.

TWA Plans Enlarged Avionics Program

Trans World Airlines will install more than $2.5 million worth of electronic radio and radar equipment in its fleet of 167 aircraft this year.

Breakdown of TWA's expenditures for new electronic communications and navigation aids includes:

• **$1,300,000 for installation of 360 channel VHF radio** in all Constellation aircraft, for improved short range air-ground communications.

• **$660,000 for 144 channel HF radio** in Constellation 749A aircraft used in international service, for improved long range air-ground communications.

• **$400,000 for weather surveillance radar** in 20 Super G Constellations, which is in addition to $210,000 of pre-installation work done on the planes during manufacture by Lockheed Aircraft Corp.

USAF, Navy Have $13 Billion Fund On Hand for Aircraft Contracts

Washington, D. C.—The Air Force and Navy launched the new fiscal year on July 1 with approximately $13 billion available for new contracts for aircraft and related procurement.

Of this total, $7.2 billion were new funds voted by Congress for Fiscal 1956. The balance was carryover—funds voted for previous years which the services had not obligated.

• **USAF's unobligated balance** at the end of Fiscal 1955 was unexpectedly low—$2.48 billion. Six months ago, USAF expected it would exceed $3.6 billion.

• **Navy's unobligated balance,** though, was unexpectedly high—more than $3.2 billion. A few months ago, Navy spokesmen told congressional committees that its carryover would be high due to contract cancellations of obsolescent equipment. But these spokesmen had anticipated only a $1.3 billion carryover.

As of July 1, USAF had $8.8 billion and Navy $4.2 billion available for aircraft contracts.

During June, the last month of Fiscal 1955, Air Force obligated almost $1 billion. Navy, for the same month, showed cancellations of $898 million more than obligations for new contracts. For Fiscal 1955, this was the picture:

• **USAF had obligations** totaling over $5 billion. This was more than three times the $1.6 billion obligated during the first year, Fiscal 1954, of the Eisenhower Administration.

• **Navy's contract cancellations** during the year, though, exceeded by $170 million its obligations in new contracts for aircraft and related procurement.

On the expenditure side, the two services started Fiscal 1956 with a total $25.4 billion available for payments on new aircraft and related procurement contracts and for payments on production underway. Expenditures for procurement largely reflect obligations of two years previous.

During 1955, expenditures totalled $8.7 billion. This was divided: USAF, $6.9 billion; Navy, $1.8 billion.

In the current fiscal year, expenditures of the two services for aircraft in related procurement are expected to drop, reflecting a decline in obligations from $12.4 billion in Fiscal 1953 to $2.3 billion in Fiscal 1954.

Aircraft and Related Procurement Funds

The following details show the obligation and expenditure of funds for aircraft and related procurement since the start of the military build-up after the outbreak of the Korean War in June 1950.

The Air Force and Navy had unobligated funds on hand for new aircraft and related procurement contracts totalling almost $13 billion at the end of Fiscal 1955 and unexpended procurement funds of more than $25 billion. The details:

OBLIGATIONS (in millions)				EXPENDITURES (in millions)		
AIR FORCE	NAVY	TOTAL	FISCAL YEAR	AIR FORCE	NAVY	TOTAL
$7,405	$3,147	$10,552	1951, Total	1,931	591	2,522
10,553	3,925	14,478	1952, Total	4,341	1,328	5,669
9,296	3,117	12,413	1953, Total	6,472	2,127	8,599
1,614	756	2,370	1954, Total	6,909	2,388	9,296
			BY MONTH			
$130	$102	$232	July	519	143	662
33	44	77	Aug	565	157	721
549	115	664	Sept	481	135	617
168	456	624	Oct	538	186	725
354	43	396	Nov	501	162	663
1,613	−24	1,588	Dec	644	165	809
133	−139	−6	Jan	802	120	922
107	27	134	Feb	506	155	661
468	26	494	Mar	595	168	763
218	79	297	Apr	530	122	651
344	1	346	May	570	153	723
903	−898	5	June	708	168	876
5,019	−169	4,850	1955, Total	6,959	1,835	8,794
UNOBLIGATED BALANCE				UNEXPENDED BALANCE		
2,481	3,286	5,767	June 30, 1955	11,745	6,454	18,199
6,306	906	7,212	Fiscal 1956 Appropriation	6,306	906	7,212
TOTAL AVAILABLE FOR OBLIGATION				TOTAL AVAILABLE FOR EXPENDITURE		
8,787	4,192	12,979	July 1, 1955	18,051	7,360	25,411

CAB Liberalizes Operating Rules For Air Freight Forwarders

A new, definitive set of rules has been set up by the Civil Aeronautics Board for regulation of the fast-growing air freight forwarding industry.

The CAB has followed closely the recommendations of examiner Paul N. Pfeiffer in proposing new sections for its economic regulations which set out liberal operating rules for indirect air carriers—air freight forwarders.

The new regulations are oriented toward competition within the developing industry. It is regarded as a potentially potent force in the future development of air freight for the airlines.

In its decision, the CAB extends the operating authority of 34 domestic air freight forwarders for an indefinite period.

It is pointed out that the forwarding operations are conducted without subsidy, and benefit both the shipping public and the airlines through lower rates, advertising and other factors which aid the development of air freight.

In judging the public need for forwarders, the Board says: "We find it in the public interest to maintain competition in air freight forwarding, and believe that the question whether a particular forwarder's services would fill a public need should be left to the judgment of the shipping public itself."

ACI Plea Denied

The application of Air Cargo, Inc. for status as a forwarder is denied. Since ACI is owned by the scheduled airlines, the CAB feels such authorization would tend to discourage cargo competition among the airlines concerned.

Forwarders affiliated with motor carriers or surface carriers are approved as indirect air carriers providing the record shows no basis for denial. Also, non-operation of a current forwarder is not considered a basis for denial since such forwarders complied with technical requirements.

The CAB has approved a new document form which describes the operating authority of forwarders in positive terms, rather than the former negative terms of an exemption. The new form is designed to lend the indirect carriers prestige and present them in a more positive light.

The decision to extend the authority for an indefinite period was made in view of the fact that forwarding is a non-subsidy operation and that the lack of a definite temporary status will help the forwarders in developing their business. The indefinite extension of authority also leaves CAB free to make adjustments in the regulations as they seem warranted in the future.

REA Holds Status

Cooperative shippers associations are also approved as indirect air carriers for an indefinite period for the same reasons applied to forwarders, since their functions are similar. The status of Railway Express Agency in its air express operations remain unchanged.

The applications of two railroad dominated forwarders—Universal Air Freight Corp. and National Air Freight Forwarding Corp.—are also approved. The Board feels the danger of domination by the two companies is negligible in view of the development of strong independent forwarders, and their participation can be a factor in promoting competitive development of air freight.

In the case of the railroad affiliated forwarders, the authorization is for a five-year period to give CAB a chance to review the effect of their operation on the industry.

The Board has decided to waive procedural requirements for forwarders and cooperative shippers associations in the interest of freedom of entry in an industry which doesn't involve air safety or subsidy considerations.

Joint rate agreements with airlines which provide rate differentials in favor of forwarders are approved where differentials are matched by such benefits to the airline as advertising and solicitation done by the forwarder. Such agreements must be open to other forwarders and airlines on the same terms.

Forwarders are also permitted to act as an agent for shipper or airline on particular shipments and to engage in joint loading practices with other forwarders to promote large consolidations and lower rates.

No Charter Curbs

Space allocation agreements with airlines are not allowed by the new regulations. CAB feels such a practice might lead to discrimination, particularly where capacity is in short supply.

The Board finds that restrictions aren't needed on the chartering of aircraft by air freight forwarders. Since restrictions already exist on charter operations of airlines and since there are no restrictions applied to ordinary shippers, the Board feels it is important to avoid unnecessary restriction of forwarders which are promoting greater air freight volume.

Hiller Convertiplane Crash

San Francisco—A rocket-powered experimental convertiplane being developed for Hiller Helicopters overturned and burned last week during low altitude hovering tests. It is one of several unconventional designs the company is testing. Injured in the crash was test pilot Robert Hall and Otto Santoff, a research engineer and subcontractor to Hiller on the project.

Forwarding operations in the Hawaiian Islands are approved on the same terms, and for the same reasons, as those in the continental United States.

Renewal of the authority of Flying Cargo, Inc., Highway Express Lines, Inc. and World Wide Services, Inc. is denied by the CAB since the three companies failed to take any part in the proceeding on which the decision is based.

Insurance coverage required of a forwarder to protect the public interest.

CAB members Chan Gurney and Harmar Denny agreed with the majority on the general disposition of the case, but they dissented on the joint rate agreement issue. The dissenting members hold that approval of such agreements by the majority is both illegal and economically unwise.

Gurney and Denny feel that special rate agreements between forwarders and airlines will lead to bargaining practices among competitors and thus to disruption of the cargo rate structure. Such practices, according to the dissent, would depress the cargo rate level and nullify the protection of economic rate levels provided by the CAB's minimum rate orders.

Guatemala Service

Pan American World Airways' Los Angeles-Guatemala City route has been extended for five years by the Civil Aeronautics Board.

CAB also added San Francisco as a co-terminal with Los Angeles. The route, first certified in 1951, serves a connecting link between the West Coast and PanAm's Latin American system.

The Board decided not to make PAA's West Coast-Guatemala service permanent in view of the fact that it still requires subsidy, and uncertain future conditions call for review after a further period of operation.

Pan American's operation to Guatemala was inhibited before the July 1954 revolution, but traffic has increased substantially since then.

B-47 Crews Take Honors in SAC Meet

By William Coughlin

March AFB, Calif.—The B-47 jet bomber proved its combat worth here last week—effectively silencing critics who had predicted that it could neither bomb nor navigate accurately—as Boeing Stratojet crews walked off with top honors in the annual Strategic Air Command bombing and navigation competition here for the first time.

SAC as a whole did about as well. The final scores in this "World Series of Airpower" indicated that the command's bombing accuracy had improved by 15% within the last year, while navigational ability had climbed an astonishing 40%. An Air Force officer connected with the meet said results indicated that SAC would be 90% effective during actual combat.

A pleased Gen. Curtis E. LeMay, the SAC commander, commented: "Each year we do a more professional job, a more accurate job."

Combat crews from 23 B-47 wings and 10 B-36 wings competed in the week-long test of bombing and navigational ability. Winner of the Fairchild Trophy for the highest combined bombing and navigation scores was the 320th Bomb Wing from March AFB, flying B-47s.

The 320th scored 1,630 points out of a possible 2,000. Second with 1,619 points was the 92nd Bomb Wing from Fairchild AFB, a B-36 unit.

Points were based on a table which converted circular errors in navigation and bombing into point values. Actual distances were classified.

Top honors for an individual crew also went to a B-47 outfit with Maj. Horace C. Traylor of the 93rd Bomb Wing, Castle AFB, scoring 853 points out of a possible 1,000. Observer in his team was Maj. Jose L. Holguin and the co-pilot, Maj. Martin A. Speiser.

When Gen. LeMay handed the trophies to the crew from the 93rd, he also pinned spot promotions to lieutenant colonel on all three men.

The fact that jet bomber crews won the competition for the first time was regarded as particularly significant, marking the arrival of the jet age for the Strategic Air Command. In the last six years of competition, B-36 crews were unbeaten.

"Remember a few years ago when we got B-47s there was a lot of yacking that you couldn't bomb accurately and navigate accurately from a B-47," Gen. LeMay said. This year's competition, he added, proved otherwise.

The giant eight-jet B-52 Stratofortresses now being phased into SAC were not entered in the meet. Project officer Col. E. A. Perry explained that they were not included in order to avoid interruption of the training effort. The new intercontinental bombers probably will compete next year, he said.

Each wing in the competition entered two crews and provided its own maintenance team. More than 2,000 SAC officers and men took part, with B-47 wings staging out of March AFB and B-36 wings flying out of Fairchild AFB in Washington.

Each crew was required to fly three 3,000 mile missions, bombing theoretical targets in Sacramento, Spokane and Los Angeles and flying celestial navigation legs for competitive scores. Each night during the meet a bomber stream of 36 aircraft rained theoretical mass destruction on the three cities from altitudes above 40,000 feet.

Taking off at 10 minute intervals, the crews were required to meet their arrival time over the targets within two minutes of their scheduled ETA.

Ground radar stations, recording signals sent out by each aircraft to indicate the exact moment of the theoretical hydrogen bomb drops were able to gage within 150 ft. where the bombs would have struck. Crews were allowed to bomb one of the targets visually but were required to bomb targets in two cities by radar only.

Navigational ability was judged solely upon celestial navigation without the help of radio aids or radar.

Col. Perry said the competition indicated that SAC would be 90% effective if it were required to put its capability to use in actual combat at this time.

Turboprop B-47 On Maiden Flight

The Boeing XB-47D, a standard B-47 converted into a test bed for the powerful Curtiss-Wright T49 turboprop engine, is shown taking off from Boeing Field, Seattle, on its maiden flight. Two T49 engines, rated as the most powerful turboprops ever to fly, are mounted at the inboard pod positions. The two outboard General Electric J47 turbojets of the conventional B-47 have been retained on the converted Stratojet.

British Military Planes Termed 'Obsolete' by Hoover Task Force

In a report from one of its task forces, the Hoover Commission has been told that British military planes being purchased with U. S. funds have had production troubles and may be obsolete by the time they are operational.

The task force told the commission:

• **The Gloster Javelin all weather fighter** has not been evaluated and approved by USAF.

• **The Vickers-Armstrongs Swift fighter** lacks stability and may be cancelled.

• **The English Electric Canberra** bomber, which recently set a round-trip trans-Atlantic record, is nearly obsolescent.

• **The Hawker Hunter fighter** has deficiencies and further delays are expected in deliveries.

The task force says its information was up-to-date as of Jan. 11, 1955. As of June, it says, the Hawker Hunter was expected to be a better aircraft than the North American F-86 but "certainly inferior to the F-100 and other types of supersonic U. S. and Russian fighters."

For the Foreign Operations Administration, the task force raised three questions:

• **What will be done** with $200 millions of funds appropriated but not obligated for the aircraft program?

• **What's being done** to review a 1953 contract for the Hunter that "cannot be met with acceptable planes?"

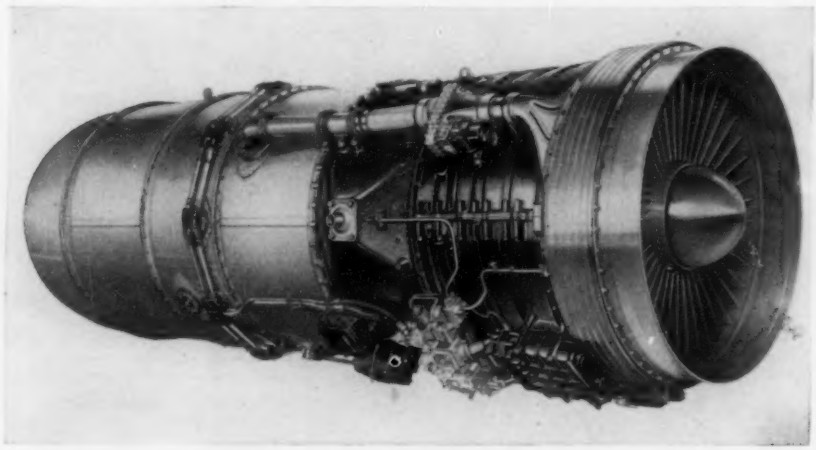
• **If the Hunter** contract is cancelled, how will FOA use the released funds?

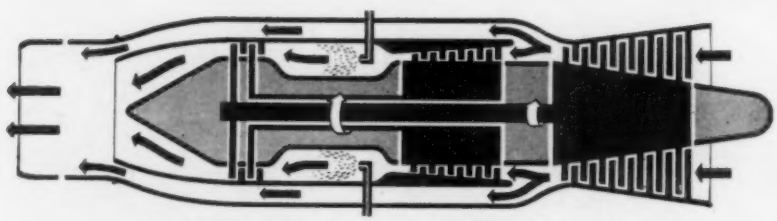
The task force cites articles in British newspapers in support of its criticism of the aircraft.

The investigating group was composed of Stokeley W. Morgan, Homer S. Fox and Bernard S. Van Rensselaer. Van Rensselaer prepared a report several months ago that carried similar criticisms of the FOA aircraft program.

Harold Stassen, then FOA administrator, called the report at that time the "most inaccurate . . . I have ever seen."

In discussing the Canberra bomber for the Hoover Commission, the task force says that the Martin B-57 version of this aircraft is a "marked improvement." It adds that if Martin had been given the order that went to English Electric Co., "It would have meant jobs for between 12,000 and 15,000 workers at the Glenn Martin plant for one or two years."





Jet Engine With 13,000-Lb. Thrust

The Conway by-pass engine, developed by Rolls-Royce Limited for the British government, has been type-tested at 13,000 lb. thrust and has, its manufacturer reports, the lowest specific fuel consumption of any type-tested jet engine. The Conway will power the V. 1000 military transport. Noise level of the engine is reduced by lower jet speed and special jet nozzle. Diagram shows schematic of by-pass engine.

Gyron in Test

London – De Havilland's Gyron is completing its 150 hr. type test at 15,000 lb. static thrust. Results near the end of the trial indicate that the company might be able to announce the successful completion of the type test during the Farnborough show this week. DH expects Gyron eventually will exceed the 20,000 lb. thrust mark. Although not type tested, recent models have been run at considerably in excess of 15,000 lb.

Commission Scoring Raises British Hackles

London—British reaction to the Hoover Commission charge was official silence, unofficially, "This isn't cricket."

One undercurrent of opinion was that the U.S. report was timed to discredit British Aviation on the eve of the Society of British Aircraft Constructor's Aircraft Show and Flying Display that begins this week at Farnborough.

Generally, however, there was a reluctant admission that Britain has had trouble with its postwar aircraft but has done the best it could. However, the British claim some design principles are actually far advanced.

Aircraft by aircraft, this is their rebuttal:

• **Javelin** orders for earlier Marks have been cut, but orders for advanced models have been increased. The government and Glosters claim it will be in service by the year's end. Gloster further says USAF has not officially evaluated the Javelin.

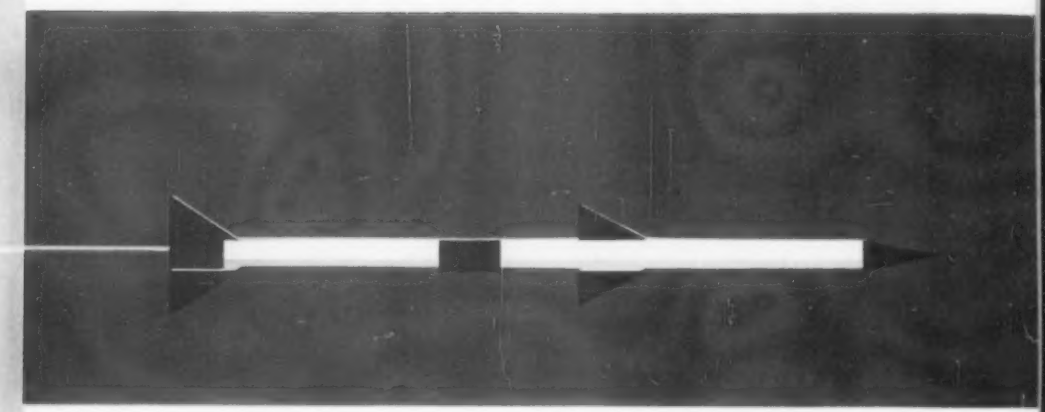
• **Swift.** Vickers asks, "Why beat a dead horse? Orders have been cancelled and everyone knows it."

• **Canberra.** English Electric claims its Mark 8 is comparable in all respects to the U. S.-made B-57B, and that the later PR-9 photo-reconnaissance version is superior to both in altitude performance. It admits early Marks obviously are obsolescent.

• **Hunter.** Air Ministry has complete confidence in the Hunter. It claims answers to all "bugs" are known and are being incorporated into normal maintenance schedules. Several hundred are in service in Britain and on the continent. Hawker proudly quotes recent U.S. Defense Department statements to the effect that Hunter is the best interceptor in Europe.

Guiding or intercepting

Research, development, production of electronic computers for defense



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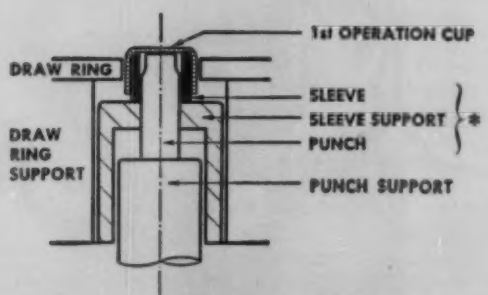
Cincinnati 8" Hydroform

THE NEW CINCINNATI 8" HYDROFORM brings decided time and cost savings to manufacturers required to produce small, deep drawn and formed parts. Illustrated above is a typical example.

The photo shows, in sequence, the three Hydroforming operations to produce an electron tube component. Material is 0.020" O. F. H. C. copper. This part would have required five or six operations by conventional methods.

To illustrate the simplicity of Hydroform tooling, the diagram below, right, shows the redraw tools used in the second operation. The sleeve, sleeve support and punch were made of ordinary steel, turned on a lathe. The 1½" dia. x 1¼" deep 1st operation cup was simply placed on the sleeve and redrawn. Redraw tools for the final operation were similar and equally inexpensive.

Parts from sheet materials up to ¼" steel, from blanks up to 8" in diameter, can be drawn on the 8" Hydroform. Maximum draw depth is 5". For larger work, Hydroform machines of 12", 19", 23", 26" and 32" capacities are available. Let a Cincinnati Milling field engineer give you detailed information on how you can profitably apply Hydroforming to your work. For a description of the process and specifications of the six machine sizes, write for Bulletin M-1759-3.



*2nd Operation Redraw Tools

CINCINNATI **Hydroform**

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U.S. Aircraft Exports Lead World

U. S. aircraft industry exports led the world in 1954 with a total of $618.9 million, nearly four times the total aircraft exports of $156 million by Britain, principle competing country.

John H. Payne, director of export services, Aircraft Industries Association, said the $618.9 million was $260 million under the all-time high set in 1953. It remains the second highest export volume the industry has had in a peacetime year.

Payne noted that the bulk of the 1954 sales, $497 million worth, represented classified items distributed through military channels. These included all military, cargo and used transport aircraft, engines of 400 hp. and over, propellers, instruments, all accessories, spare parts and ground handling equipment. The remaining 20% of the industry's total dollar volume production, was sold to civil interests in 79 countries and gained 33% over the amount exported in 1953.

The breakdown of foreign sales of U.S. aircraft and parts in 1954 shows: commercial transports, $96 million; new utility, personal and liaison planes, $4.5 million; rotary wing aircraft, $4 million; used aircraft, $16.2 million.

Commercial air transports sold to overseas buyers in 1954 totalled 112 with the dollar value up $16.7 million over the preceding year. Canada was the largest foreign buyer of commercial airliners with nine transports purchased for a total value of $15.4 million. Canada also spent $1.8 million with U.S. manufacturers for 191 smaller aircraft of various types.

While most of the rotary wing aircraft exported in 1954 were of military type, there were 74 helicopters shipped to civil users in 17 different countries.

The number of smaller engines (less than 400 hp.) exported in 1954 was more than double the number sold the year before with a total of 728 compared to 347. Value of the smaller U.S. aircraft engines shipped overseas totalled $1.5 million.

In his report, Payne stressed there are few industries that ship a greater portion of their products to foreign countries than does the U.S. aircraft industry. In the calendar year 1953, he said, goods manufactured and sent abroad by the American aircraft industry represented 4.1% of all merchandise sold overseas by American businesses.

New Flying Boom for KC-135

A new, high-speed Flying Boom (shown above) for inflight refueling has been developed for, and installed on, Boeing's KC-135 jet tanker prototype. The jet tankers, now in production for the USAF at Boeing's Renton, Wash., plant, will be used in refueling B-52 Stratofortress jet bombers and late-model jet fighters. For in-flight refueling pictures of B-52 by earlier boom and tanker plane, see next page.

CPA, Trans-Canada Trade Airline Routes

Toronto—Trans-Canada Airlines has traded its Toronto-Mexico City route to Canadian Pacific Airlines in exchange for two domestic routes with the approval of the Canadian Air Transport Board.

Announcement of the trade said Trans-Canada received former Canadian Pacific routes between Montreal, Quebec City and Seven Islands and Montreal, Rouyn, Noranda and Toronto. In addition, CPA is turning over its service from Quebec City to Baie Comeau and Forestville to Quebecair Ltd.

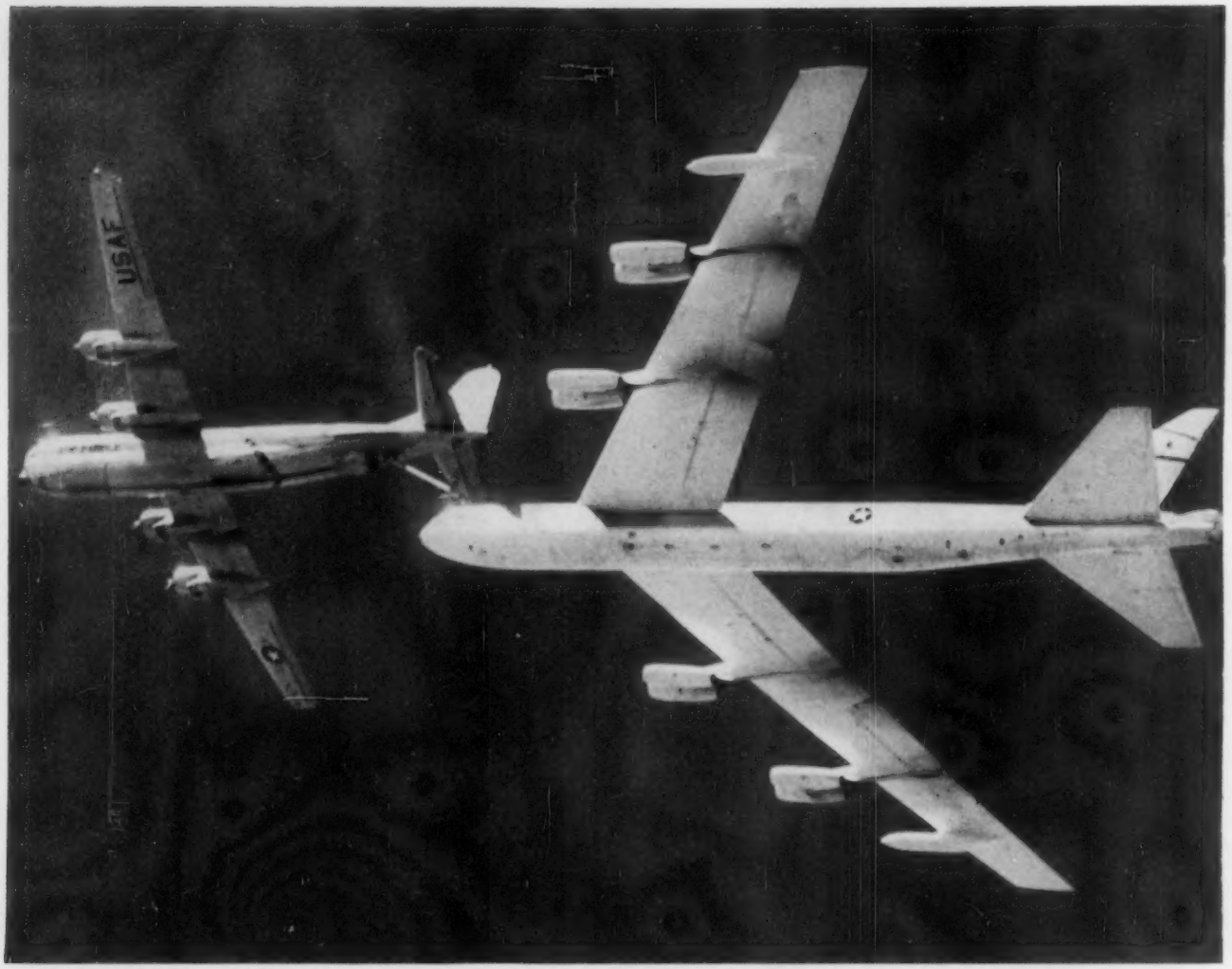
The Montreal-Seven Islands route received by Trans-Canada skirts along the northern shore of the St. Lawrence River, tapping pulp and paper towns and the iron ore port of Seven Islands, from which ore from the Laborador mining area is shipped to U.S. and Canadian steel mills. The Montreal-Rouyn-Noranda-Toronto route pushes into the copper and gold mining area of northwestern Quebec province.

CPA's Toronto-Mexico City non-stop route will complement its Vancouver-Mexico City non-stop route. The new route will be the only CPA route in eastern Canada.

TCA in the exchange gets a section of the transcontinental Canadian route which will likely be extended from Seven Islands to St. John's, Newfoundland, to tie in with its trans-Atlantic services. TCA will continue to operate its Toronto-Tampa non-stop route and its services into the Caribbean area.

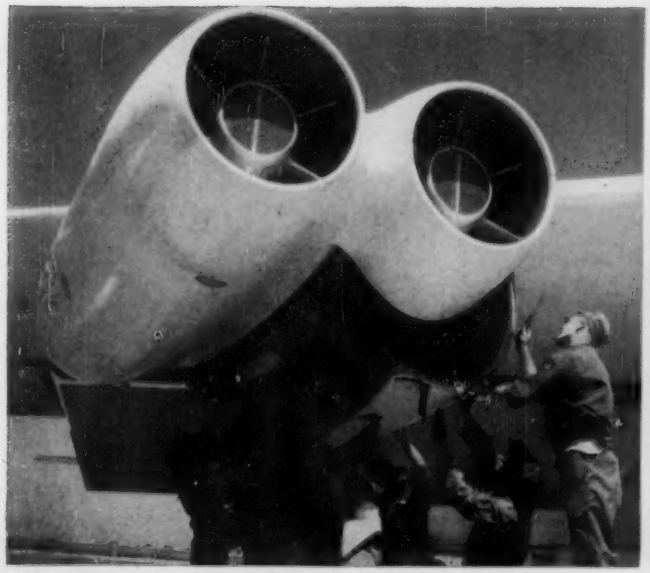
Malton to Expand

Toronto airport developments costing $28 million are in the works. Of this, $25 million will go for Malton Airport, including a $10 million terminal and two runways to be extended to 10,000 ft. and 7,200 ft. Toronto Island airport will get improvements costing $3 million.

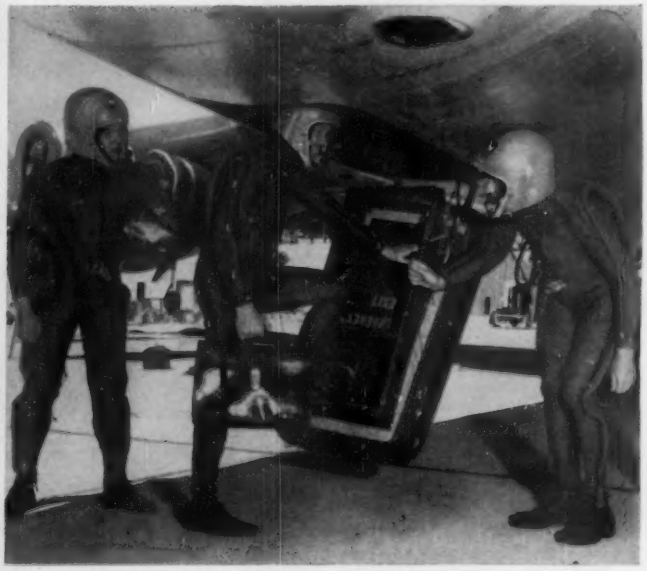


STRATOFORTRESS of USAF's first B-52 wing dwarfs KC-97 tanker as it slides gingerly into position for refueling exercise.

A Behemoth Joins the Air Force

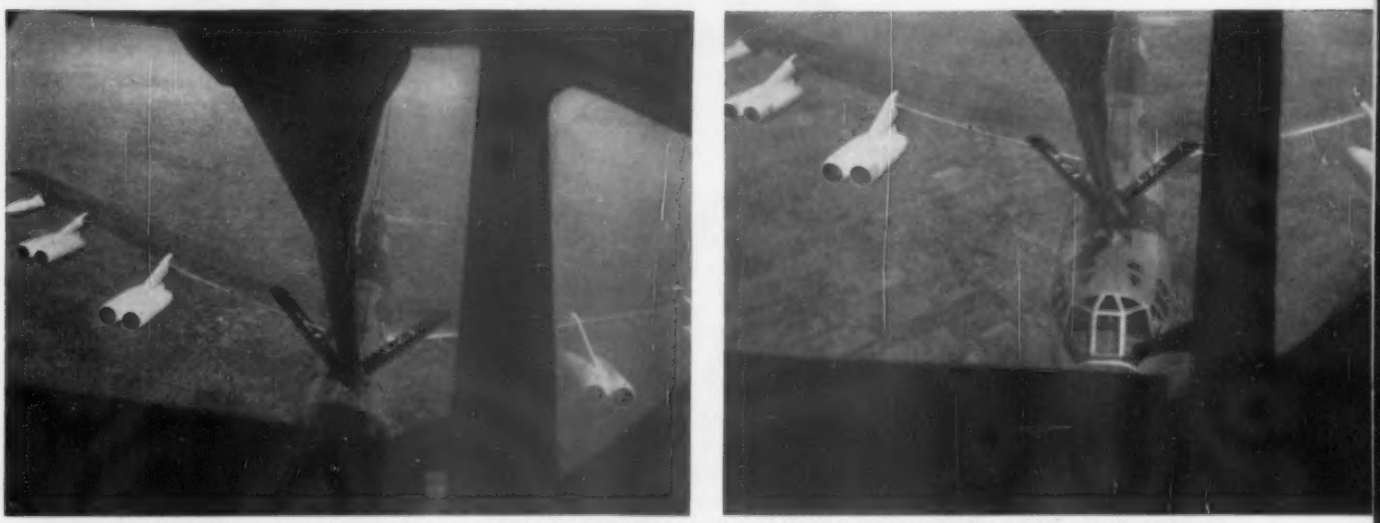


93rd BOMB WING ground crew check jets for refueling test.



THE FLIGHT crew comes aboard. Note new helmets, pressure suits.

AIRBORNE, the B-52 closes in on tanker (left) as crew watch Boeing Flying Boom suspended from KC-97 ride overhead (right).



FROM TANKER, operator flies his boom to point just above B-52 refueling socket behind cockpit, then on into locking position.

EXERCISE completed, Stratofortress returns to Merced, Calif., base. Notice unusual shape of new radome for tail turret.

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Gun Purge Door Cylinder – 3000 psi 3/4" bore x 2-1/2" stroke

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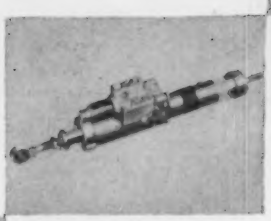
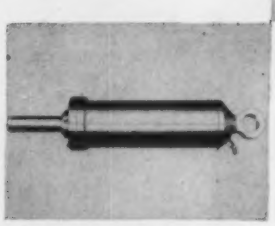
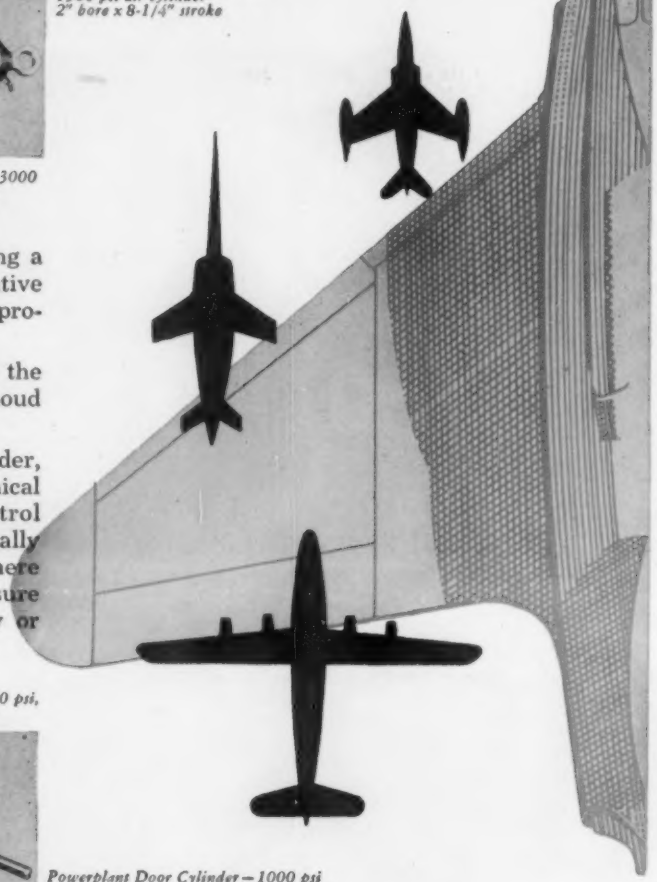


Armament Displacing Cylinder 1500 psi air cylinder 2" bore x 8-1/4" stroke



M.L.G. Actuating Cylinder – 3000 psi, 6" bore x 17-1/2" stroke



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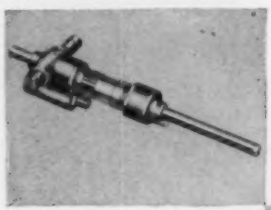
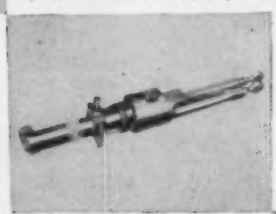
Aileron Booster Cylinder – 1500 psi, 1-9/16" bore x 6-1/8" stroke

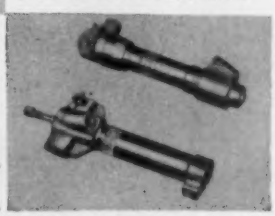


Powerplant Door Cylinder – 1000 psi air cylinder 1-1/4" bore x 8-1/2" stroke w/mech. locks at both ends of stroke



Nose Gear Door Cylinder – 3000 psi, 1-3/16" bore x 7" stroke

Nose Wheel Steering Cylinder – 3000 psi, 1-1/4" bore x 6-3/4" stroke



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CAB Asks Equal Pay On Some Latin Routes

Civil Aeronautics Board has proposed final service mail rates for Latin American operations of four U.S. airlines which equalize rates for carriers with common routes.

The new rates apply to Pan American-Grace Airways and Latin American services of Pan American World Airways, Braniff Airways and Delta-C&S Air Lines. The service rates set the price the Post Office Department will pay the carriers for hauling mail and do not include subsidy paid by CAB.

Under the proposed rates, Panagra gets 65.3 cents per ton-mile over its entire system. Braniff gets 65.3 cents per ton-mile for its system south of the Canal Zone, which roughly corresponds to Panagra's route structure. Delta gets the 65.3 cent rate for all its Latin American operations.

Between the Canal Zone and Miami, Braniff is assigned a 55.1 cent rate. Pan American gets the same rate for its entire system with the exception of two routes. PAA's New York-San Juan rate is 34.31 cents and the Miami-San Juan rate is 36.54 cents, both equal to Eastern Air Lines' rate for similar services.

The rates proposed by CAB are all lower than previous permanent and temporary rates received by the four carriers for carrying mail to Latin America.

The rates for Latin American operations were determined through a cost ratio formula based on the new multi-element rate recently set for domestic trunk airlines. Revenue ton-mile costs of the U.S. flag airlines are applied to the average of similar costs for the Big Four trunklines. The resulting ratio is applied to the Big Four's mail cost to produce the rate for Latin American operations.

In a separate order, CAB deferred the effective date of the new trunkline rate to Oct. 1 to allow the Post Office Department added time to straighten out the bookkeeping involved. Postponement of the effectiveness of the rate from Sept. 1 to Oct. 1 won't effect mail pay to the carriers since they are now receiving compensation based on the estimated average yield under the new formula.

Two Florida Nonskeds Reinstated by CAA

Aero Finance Corp. and Peninsular Air Transport, two Florida-based nonscheduled carriers, under emergency suspension by Civil Aeronautics Administration on charges of safety irregularities, have been reinstated.

CAA Administrator Fred B. Lee stated that the action did not affect the continued prosecution of safety enforcement proceedings now pending before the Civil Aeronautics Board (AW Aug. 22, p. 100). At the same time CAA filed an additional 15 charges of safety violations against Peninsular. Operation of aircraft in overloaded conditions was included in the charges.

The emergency suspension of Aero Finance was terminated by CAA subject to compliance with a set of conditions which included limiting operations to the two aircraft owned by the company. CAA reinstated Peninsular five days later.

Aviation Lobbyists Show Low Expenses

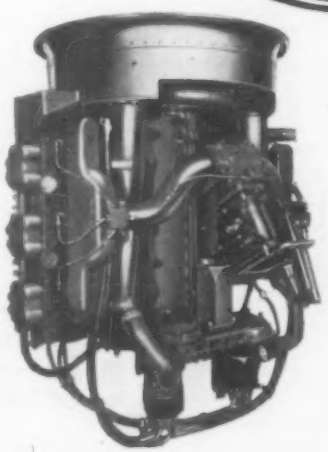
Few aviation representatives reported legislative activities for the second quarter of this year under the lobbying act.

Aircraft Industries Assn. reported receipts for lobbying activities during the quarter of $5,504.66, and expenditures of the same amount. Separately listed as representatives for AIA were: Harold Mosier, with receipts of $3,750 and expenditures of $706.05; D. C. Ramsey, no receipts or expenditures; Spence & Hotchkiss, no receipts or

4 out of 5

helicopters under 400 hp. produced this year will have power by

Franklin
FINE AIRCRAFT ENGINES



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MST 6Al-4V—A heat-treatable alpha-beta bar and sheet alloy. The Al-V system is of the beta isomorphous type, showing no eutectoid decomposition. This alloy has excellent elevated temperature properties up to approximately 750°F. MST 6Al-4V is relatively insensitive to notches and is weldable.

MST 3Al-5Cr—A heat-treatable alpha-beta bar and forging alloy which is primarily used in the annealed condition. MST 3Al-5Cr has good elevated temperature properties.

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MST 8 Mn—An alpha-beta sheet alloy used primarily in the annealed condition. It has good formability and may be used at moderately elevated temperatures in the annealed condition. Eutectoid decomposition is so sluggish that it does not occur in commercial applications.

TYPICAL MECHANICAL PROPERTIES

	Form	Ultimate Tensile Strength, psi	Yield Strength, psi	Elongation % in 2"
MST Grade III (Unalloyed) . .	Sheet, Bar	70,000	50,000	25
(3 different strength levels) .	Sheet, Bar	85,000	65,000	23
	Sheet, Bar	100,000	80,000	20
MST 6Al-4V (1)*	Bar	149,000	137,000	13
(2)	Bar	164,000	153,000	18
(3)	Bar	198,000	180,000	9
(4)	Sheet	155,000	135,000	12
MST 3Al-5Cr	Bar	155,000	145,000	13
MST 4Al-4Mn	Bar	150,000	140,000	14
MST 8 Mn	Sheet	137,000	125,000	16

* (1) 1500—½—AC (3) 1700—½—WQ, 900-2-AC
(2) 1400—½—WQ, 1100-8-AC (4) 1450— 2—FC to 1100-AC

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expenditures. Avery McEee was listed as a representative of Hill & Knowlton, Inc.

Other reports, with receipts and expenditures for the quarter:

Stanley Gewirtz, Air Transport Assn.: no receipts; expenditures, $80.75.

Edward Rodgers, Air Transport Assn., receipts, $1,250; expenditures, $611.81.

Laurance Henderson, North American Airlines: Receipts, $1,950; expenditures, $487.

Charles Parker, National Aviation Trades Assn.: Receipts: $1,183.34; expenditures, $1,102.41.

Wayne Weishaar, Aeronautical Training Society: receipts, $3,300; expenditures, $4.50.

Larry Cates, Air Line Pilots Assn.: receipts, $2,661.30; no expenditures.

Dwight Taylor, American Airlines: receipts, $2,350; expenditures, $590.

John C. Cone, Pan American World Airways: no receipts or expenditures.

John Floberg, Conference of Local Service Airlines: no receipts or expenditures.

Safety Men Shifted

Civil Aeronautics Administration has reassigned several officials in the Office of Aviation Safety as part of a program of widening technical experience in aviation matters.

First change involved the appointment of Burleigh Putnam as acting chief of the General Safety Division.

Other changes include the transfer of L. W. Ashwell to Los Angeles as chief of the Air Carrier Safety Division in CAA's IV region. Ward Masden succeeds Ashwell as deputy chief of the Air Carrier Safety Division, Washington, D. C. E. L. Yuravich, chief of the Region IV Air Carrier Safety Division, is assigned to Washington where he will be an area supervisor in the safety division of CAA's International Region.

SALA Gives Up Stock

San Jose—The Costa Rican Government has announced its acquisition of 10% interest in the commercial aviation repair and maintenance facilities of SALA under a financing program. The government is scheduled to own 25% of the company stock within the next three years.

SALA, which is moving its entire repair facilities from old La Sabana Airport to the new Coco International Airport is the only privately owned and operated repair and maintenance organization in Latin America with CAA certification for commercial work.

SALA recently signed a contract for all repair and maintenance on aircraft, including helicopters, operating for the U. S. Army in the area.

French End Gas Tax

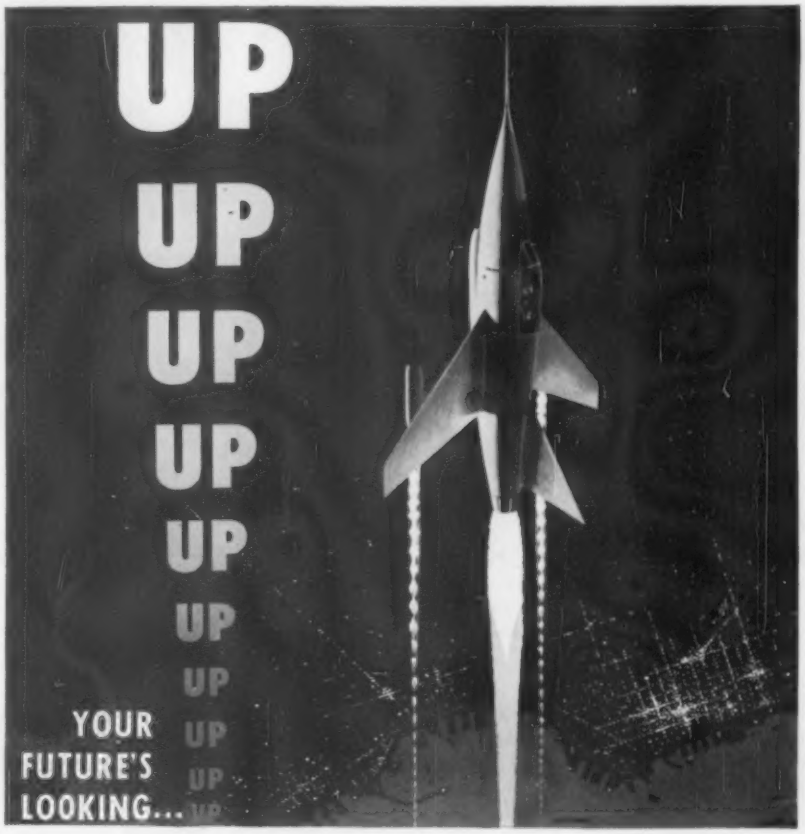
Paris—The French government has decided to remove the tax on aviation gasoline following favorable cabinet action on a proposal submitted by the Ministry of Public Works and Transport. The price of regular aviation fuel will drop from 76 francs to 39 francs per liter (82.2 cents to 42.2 cents per gallon).

Apart from the obvious importance to private flying in France (the tax has not applied to fuel required for international airline operations), two important economic benefits are expected to result from the decision.

First, commercial aviation within France should be given a needed boost—internal airline operations in France today are almost non-existent with airline companies laying much of the blame on high fuel costs.

Second, engine-check and repair work is expected to receive a boost—much of this work is now done in foreign shops due to the high cost of fuel.

A by-product of the move should be a renewed interest in private flying clubs. While such clubs have in the past received a rebate on part of their gasoline taxes, the high operating cost of private planes has discouraged many from learning to fly.



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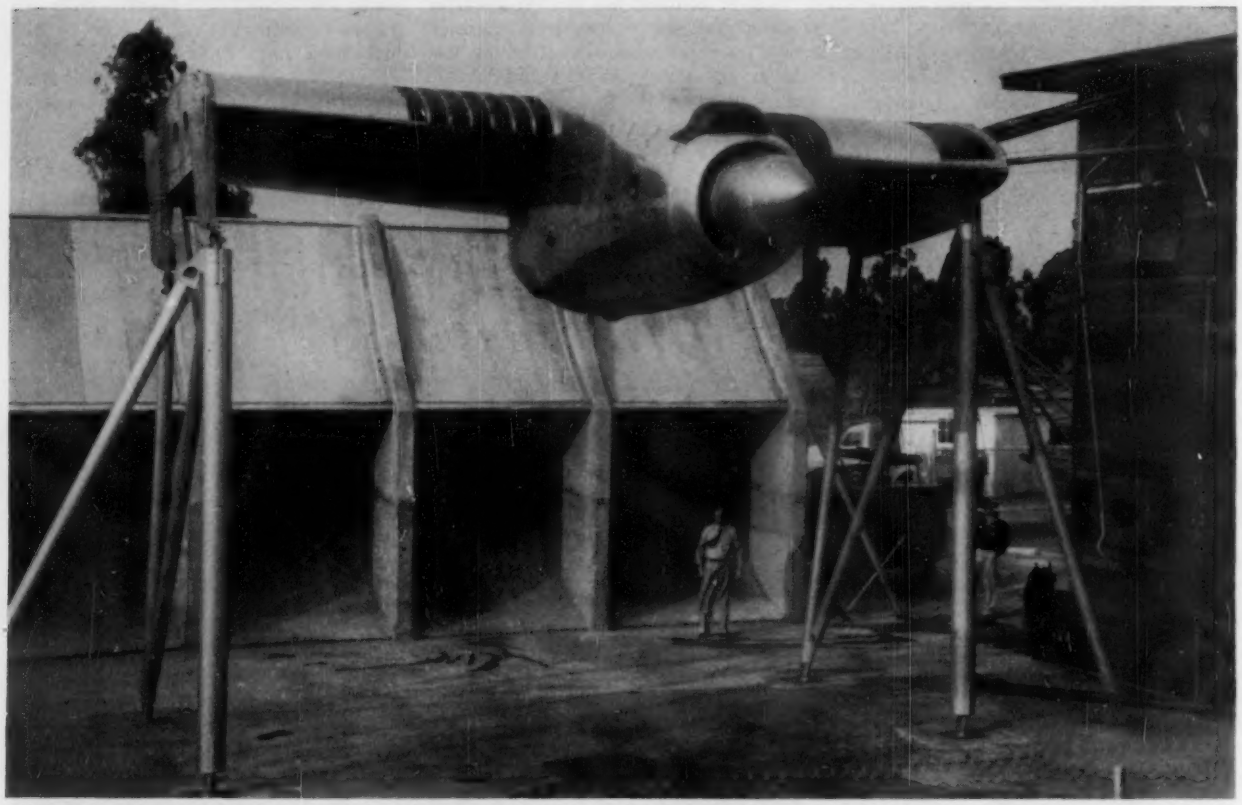


OUTDOOR TEST STAND at new Douglas laboratory with Pratt & Whitney T34 turboprop engine housed in right-hand nacelle of C-133.

Ground Tests Spur C-133, B-66 Production

By Irving Stone

Long Beach, Calif.—When the first turboprop-powered C-133 rolls off Douglas Aircraft's assembly line in November, many of the cargo plane's systems and components will have been ground tested and proved out in order to shorten the actual flight test time.

This ground-testing—pacing the assembly of the plane—is being done in a new $6-million engineering test laboratory at the company's Long Beach Division.

Systems and components of Douglas' B-66 bomber series also are being tested and refined in the new laboratory.

The lab is expected to be fully functional within the next few months—about 95% of equipment checkout is now complete. It is an Air Force facility, in which Douglas has borne part of the cost.

About 150 test engineers are on tap to design and originate test setups. Approximately 300 other technicians are available to set up the tests and operate the equipment under instructions of the facility's test engineers.

The laboratory does considerable development work in connection with problems encountered in test evaluations and emphasizes the growing importance of more extensive ground testing of systems and components of today's high-speed planes.

How the Lab Pays Off

Douglas engineers point out that the expense of test-flying a modern-design aircraft is so high that it is considerably more economical to conduct tests on the ground whenever possible.

This ground testing, they say, effectively simulates the service conditions required to prove system and component adequacy, indicates where and how design improvement may be directed and leaves only a minimum of proving to be done by actual flight test.

This is important, Douglas engineers say, because frequently the density of the modern plane will not permit complete instrumentation of the various systems.

Also, in flight testing it is difficult to find the wide range of environmental conditions which can be simulated with relative ease in the lab.

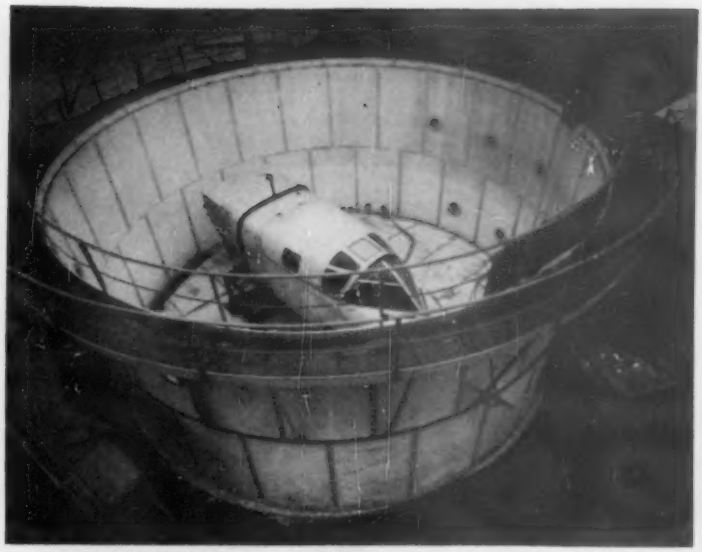
Safety, too, can more easily be controlled in the lab than in the flight plane. With modern systems becoming increasingly complex, this safety factor takes on increasing importance. Thus, in flight test an operational condition may show up which cannot be completely analyzed because of its intermittent nature or the danger involved in extending flight time.

Ground-Test Activities

In the laboratory, the operational condition usually can be simulated with enough accuracy for effective trouble shooting, and the answers can be obtained with safety.

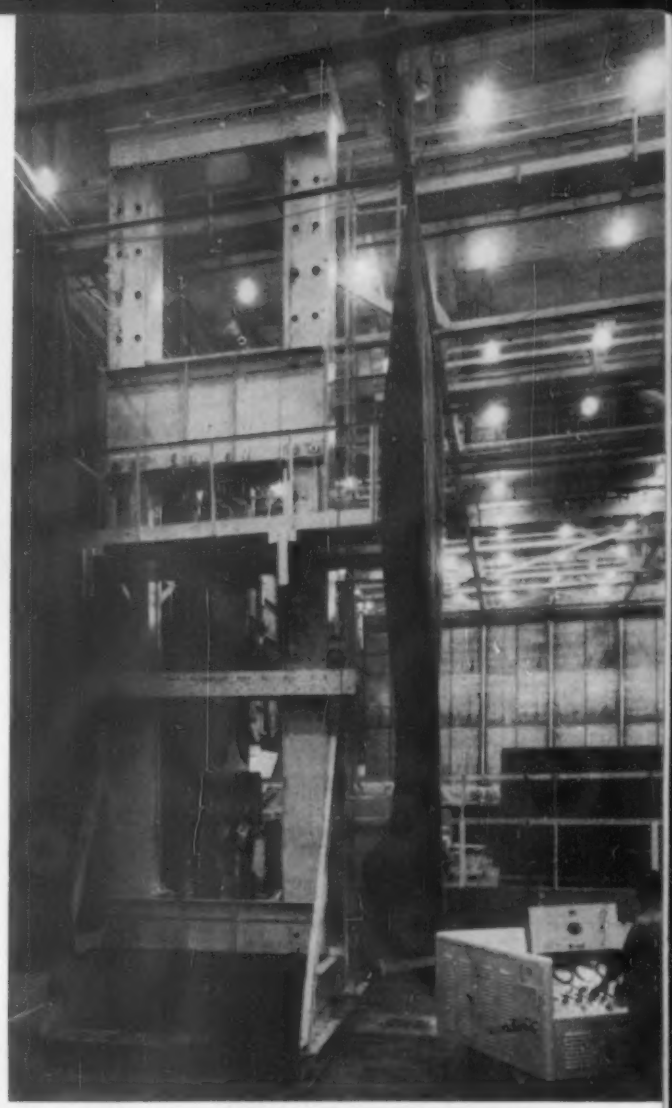
Highlights of the lab's activities indicate how Douglas engineers check out systems and components:

The environmental section of the engineering laboratory is of top importance. One of its studies is a vibration evaluation of a complete control system —after its components have been

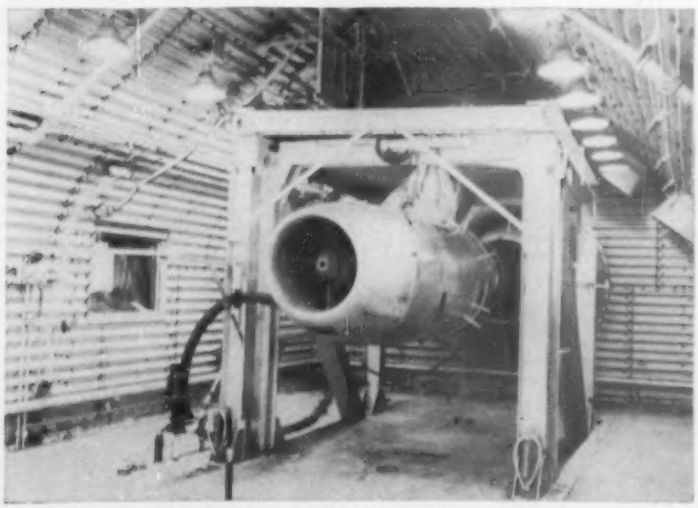


RB-66 PRESSURE cockpit section in water test tank. For test, sealed cockpit section is filled with water having greater pressure than surrounding tank water to simulate pressure differential.

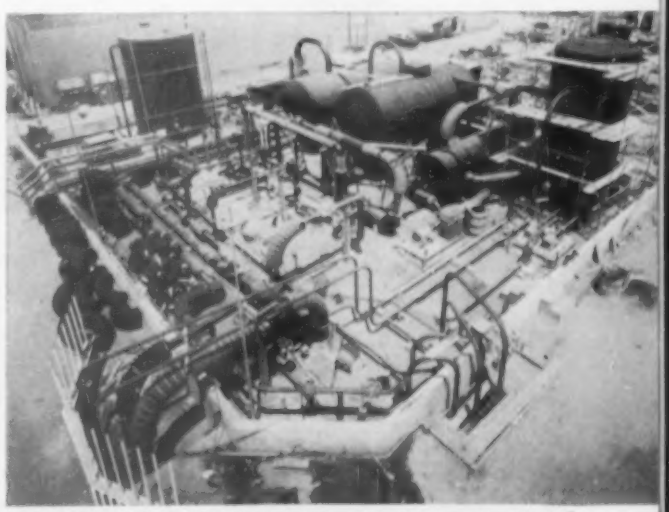
TEST RIG for B-66 series fuel-system testing with fuselage and wing tanks supported on superstructure. (Aft tank and left wing tank are not visible in picture.) The underslung tip tanks are supported (under wing tip) as they would be on B-66.



SKIN PANEL in huge 2,400,000-lb. tensile testing machine of Douglas' new engineering test laboratory. In actual operation, curtain on left is shrouded around the machine to prevent any chance of injury to the operator.



J71 JET ENGINE for RB-66 in laboratory's noise-killing test cell. Electrical junction board suspended from ceiling facilitates the interchange of J71 configurations with minimum time loss.



FUEL CONDITIONING SITE (pictured during construction) shows various tanks for fuel storage at ambient, low and elevated temperatures.

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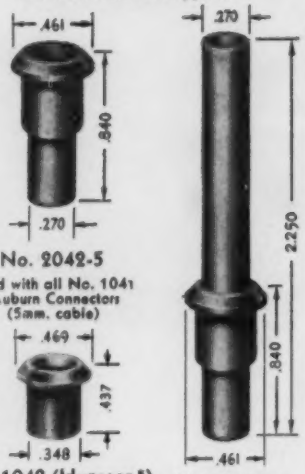

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No. 1042 (Hypreen*)
No. 1043 (Silicone)
Used with all No. 1041 Auburn Connectors (7mm. cable)

No. 1042-5
Used with all No. 1041 Auburn Connectors (5mm. cable)

*Auburn Synthetic Rubber

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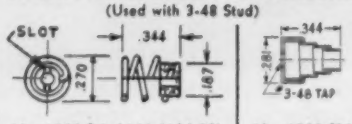


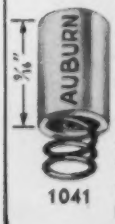
No. 1066-9A (AN 4164-22) with stainless steel coil springs

No. 1066-9V with Inconel volute springs

Teflon Connectors
with Inconel volute springs

1041-TV (9/16")
1099-TV (1")

Connectors with stainless steel coil springs



1041-C Steatite
1041-M Mycalex
1041-D Alumina
(AN 4164-2)

1041

1099-C Steatite
1099-M Mycalex
1099-F Phenolic
1099-D Alumina
(AN 4164-1)

1099

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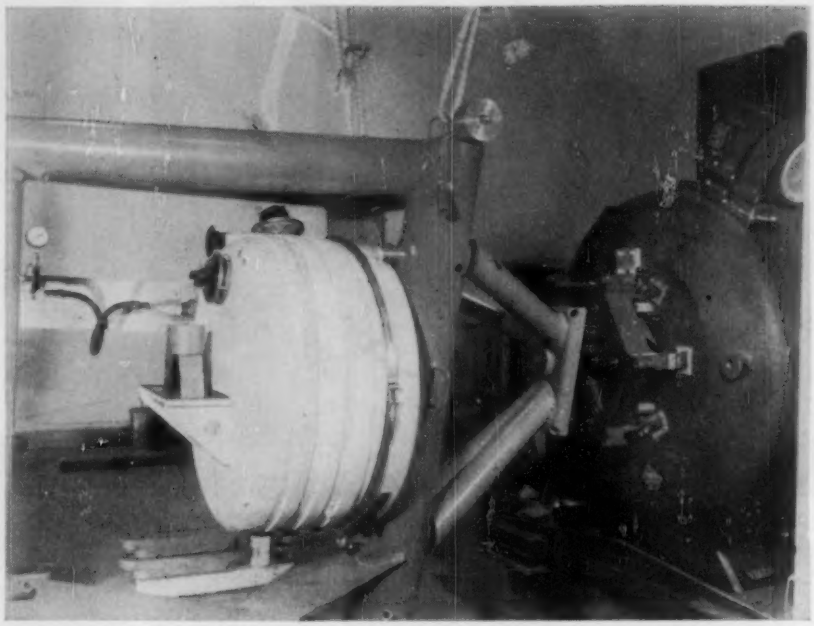

PRESSURE PACKAGE (right) connected to 2,500-lb. vibrator for avionics' testing.

checked out under environmental conditions.

This type of dynamic study of an overall system has been invaluable in solving stability problems encountered in recent aircraft designs, Douglas test engineers say.

The control system is built up full scale in the lab, including the hydraulic actuators, valves, associated mechanical linkages, cables and pulleys. The system is duplicated right out to the hinge line of the control surfaces. In place of the latter, springs are incorporated to simulate air loads at a given Mach number.

For one evaluation, the control system is excited at the surface end, for another it is excited at the pilot's input. Results present a picture of the dynamic characteristics of the system.

The amount of environmental preproving that the components of such a control system get before they are hooked up for an overall system check varies for the different units.

Environmental Tests

Electrical-mechanical actuators get the most thorough qualification tests—for operation under temperature extremes, sand, dust and humidity conditions, fungus-resistance, altitude operation, fatigue vibration resistance and explosion-contribution characteristics.

For these checks, the lab can produce temperature extremes of −100F to 500F.

The cold box for the −100F temperature is 50 ft. long, 18 ft. wide, 15 ft. high. Another box drops to −65F in the fast time of 3½ min.

Altitudes of 100,000 ft. can be simulated. One chamber capable of an 85,000-ft. condition is 40 ft. long and 12 ft. in diameter.

Aridity conditions not exceeding 5% humidity and sand and dust velocities of 2,300 fpm. can be produced.

Frequencies as high as 2,000 cps. can be duplicated—the highest value which can be measured accurately with existing instrumentation, Douglas test engineers say.

The complete fuel system is another installation which is tested under simulated service conditions in the environmental section of the lab.

The system components—tanks, plumbing, valves, etc.—are set up in a test rig to simulate the layout in the actual aircraft. Fuel cells are insulated with cork to maintain the fuel's temperature.

The system check includes rates of flow and pressure drops in the temperature range from −65F to 130F. This is done by conditioning fuel in a special facility which heats or cools as required before pumping to the fuel system in the test rig.

Altitude checks are conducted by introducing vacuum to the fuel cells to determine availability of fuel to the engines and evaporation rates.

In the same test rig, fuel flow under extreme attitudes of roll, climb and dive can be checked by rocking or tilting the fuel system.

Powerplant Section

Basic function of the laboratory's powerplant section is to test the powerplant installation for design capabilities under conditions of ground running or handling. Phases investigated include

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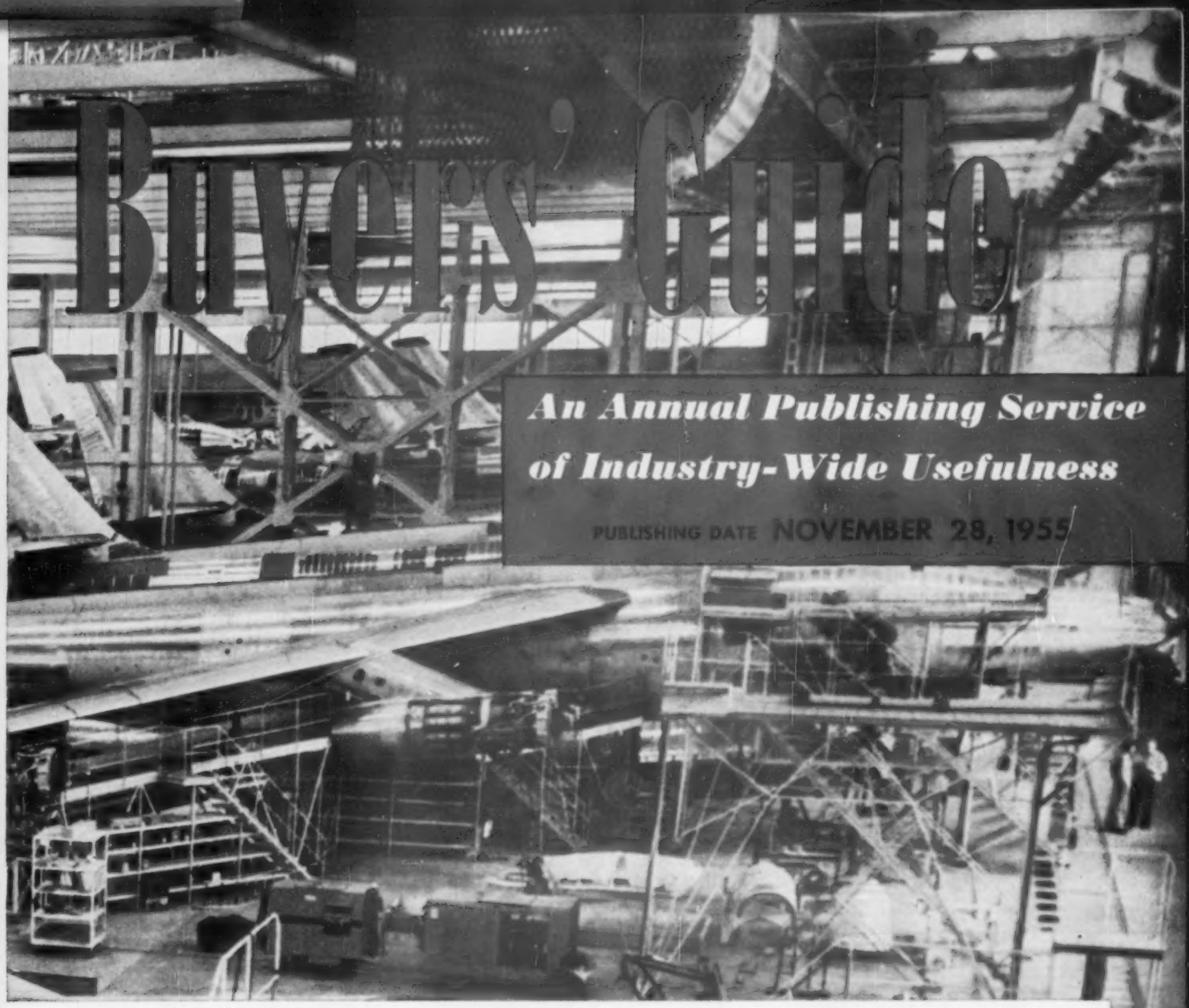

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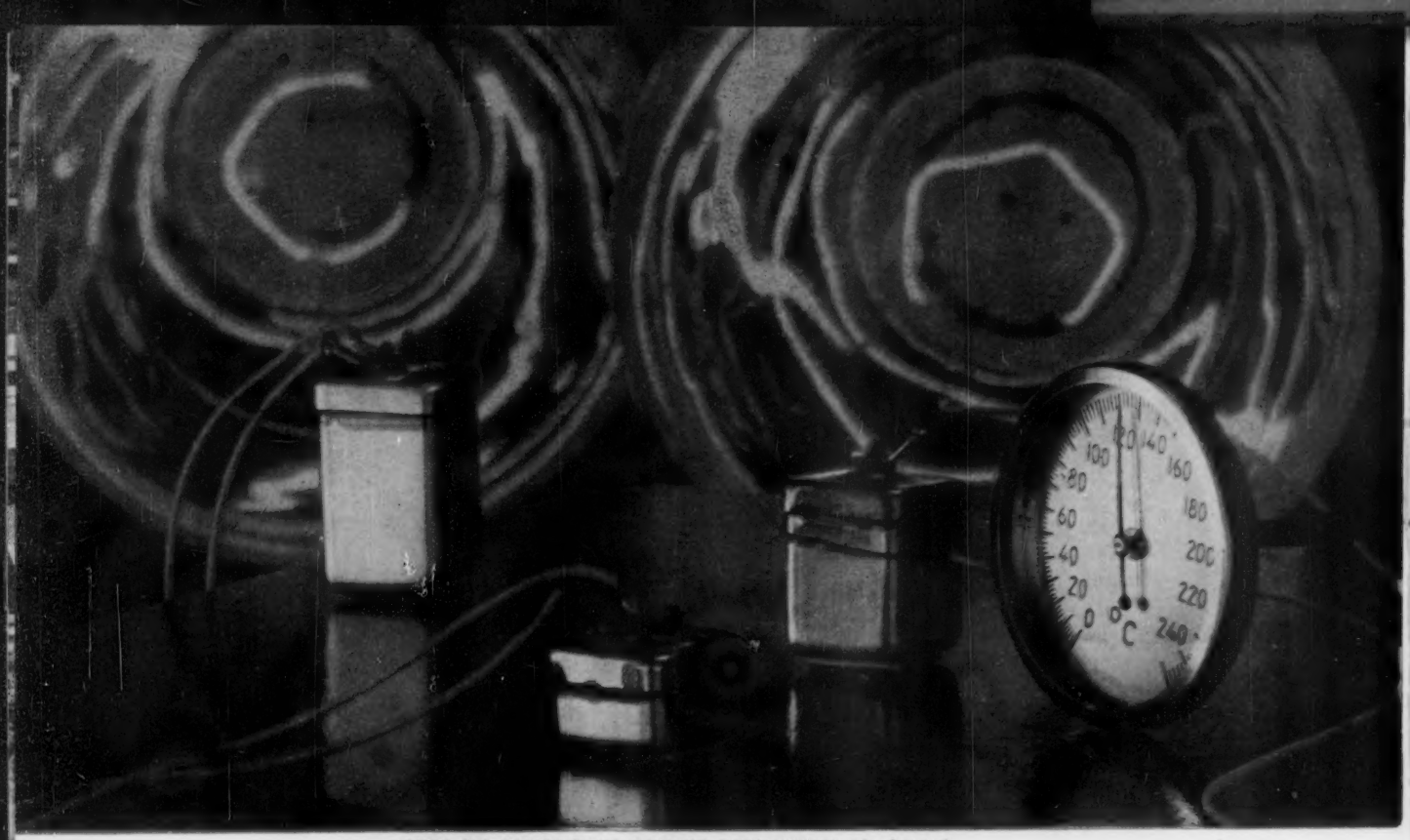

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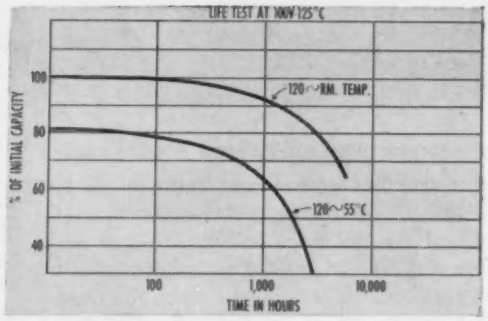
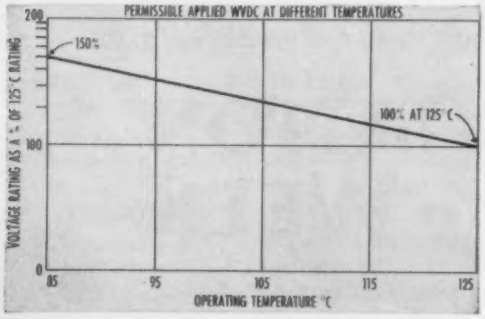


LONG LIFE of G-E high temperature Tantalytic capacitors is shown by this graph of life vs loss of capacitance for typical 100 volt d-c unit.



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30	180	110	55
50	100	60	30
75	60	36	18
100	36	24	12

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tests to determine if the structure (nacelle skin, mount fittings, nacelle-to-strut fittings and exhaust pipe) is sufficiently strong, whether accessibility is adequate for maintenance of powerplant components and if sufficient cooling is provided. Fuel and oil systems and controls, both for propellers (in turboprops) and engines, also are checked.

Cooling studies are getting close attention on both the Allison J71 engine in the RB-66 and the Pratt & Whitney T34 for the C-133. Aim of the studies is to maintain a cool installation within established limits with a minimum loss of engine power.

In their cooling studies, Douglas test engineers are investigating various configurations of aluminum alloy nacelles, as distinguished from the stainless steel units preferred by some other airframe builders.

The aluminum alloy installation requires considerably more cooling than the stainless steel. However, Douglas test engineers feel that the drag loss caused by this internal cooling air flow is less than the effective drag of the heavier stainless steel nacelle with less cooling.

Cooling is induced into the nacelle through flush ducts in the skin by aspirating effect of the engine exhaust.

Testing is done on a duplicated airplane powerplant installation including a portion of the wing, the strut, nacelle, engine and associated systems.

Powerplant installation tests for the RB-66's J71 are being conducted in a jet test-cell capable of accommodating engines with up to 20,000-lb. thrust. The cell is constructed to contain engine noise, so the control room is not insulated against sound.

The T34 turboprop engine for the C-133 is mounted on a test stand located in the open because of the propeller slipstream air requirements and the lower noise levels. The control room for the setup is insulated.

Extensive development work also is being conducted in the powerplant test section on airborne pneumatic starting systems for jet and turboprop engines. This phase of work has been given increasing attention, Douglas says, because starter power availability has not kept pace with engine starting power requirements.

Electrical Section

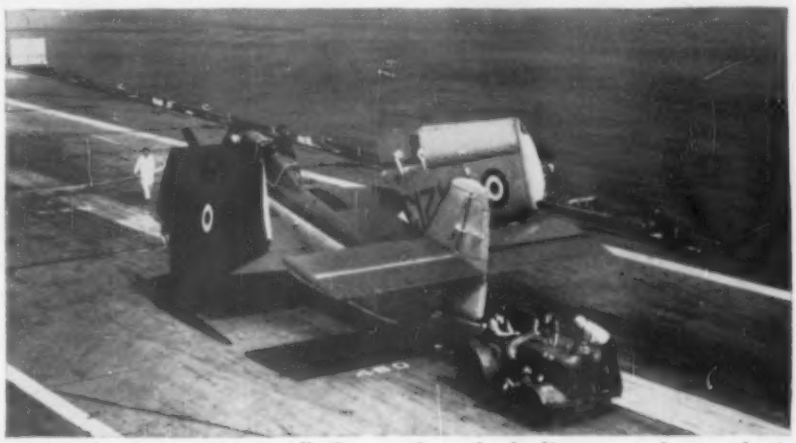
The laboratory's electrical test section has a big hand in the C-133 project.

It uses more than 1,000 strain gages on the fuselage, wing and other structural components to measure stress concentration patterns. This involves an elaborate wiring and read-out system, developed and built at Douglas, con-

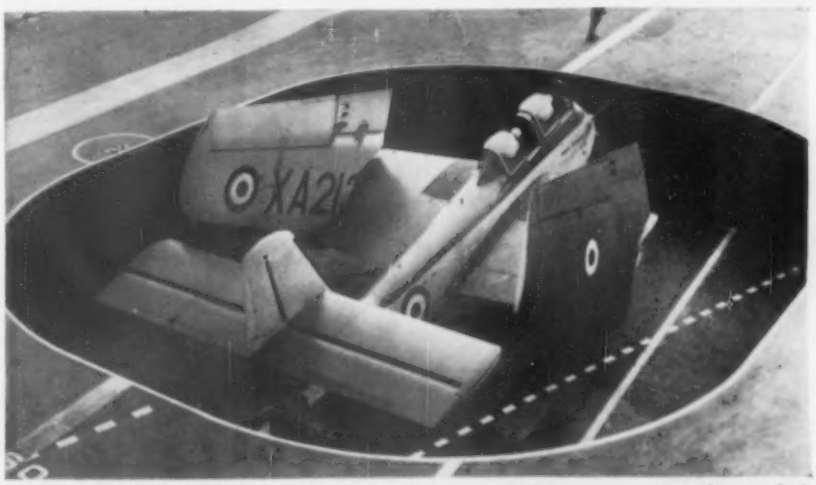
British Seamew Makes First Carrier Flight

BRITAIN'S LATEST anti-sub hunter comes in for deck-trial landing aboard H.M.S. Bulwark.

SLOWED by large wing flaps in landing, the Seamew is stopped by carrier's arresting gear.



PILOT folds wings as tractor pulls Seamew from the landing area and onto elevator.



WITH OBSERVER and pilot aboard, Seamew disappears on elevator en route to hangar deck.

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Duraflex Spark Plug Leads for all types of engines are maintained in stock at our factory for prompt shipment. For complete information write or wire today or call our office nearest you.
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sisting of large 100-channel balance panels which automatically plot curves of stress versus percent load.

Big job was in waterproofing these strain gages for underwater pressure tests of the C-133 fuselage. Unusual solution was to use simple "hot patches" to cover strain gage and wiring connections. Douglas test engineers believe this is the first time this technique has been used in the aircraft industry to waterproof strain gages.

Application of the hot patch takes no more than a minute. Moreover it is relatively inexpensive in bulk quantities when compared to other methods —which, incidentally, have not been completely successful, Douglas says.

The mockup built for the B66 electrical system was an extensive job. This involved considerable development work in fault-clearing characteristics of the system and much effort in finding suitable circuit breakers and fuses to handle large electrical overloads.

The work led to new circuit breaker designs, which were built to Douglas specifications. The new units have very fast response to insure that there will be no burnout and a resultant system failure.

Transducers for high-temperature service are getting a close look in the electrical test section in connection with jet and turboprop engine motion studies to determine growth in engine length and to investigate engine vibration characteristics. The transducers must be located in the high-temperature areas for good pickup points.

The general aim of this investigation, a Douglas engineering test spokesman said, is the development of new transducer types with accuracy and reliability not now available.

Pressurization Tests

The C-133 fuselage will be checked in a new underwater pressurization test tank now under construction at the engineering test laboratory.

Measuring 170 ft. in length, 30 ft. wide and 24 ft. high, the tank will easily accommodate the 150-ft. length and 16⅔-ft. diameter of the C-133 fuselage. The first underwater pressurization check of the fuselage is scheduled for early fall.

Both fuselage and tank will be filled with water. The greater pressure of the water in the sealed fuselage will simulate the pressure differential and create a flow pattern at points of leakage. Detection of these leak points will be facilitated by the use of a filtration plant to keep the water clean and free from mistiness.

Viewing ports along the side of the tank will permit observation during tests.

Inside the tank there will be strong

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propeller turbine aero engine to fly.

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engine was the first to be officially approved
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- The system comprises duplicate Localiser and Glide-path transmitters, 3 Marker Beacons and Mains Voltage Regulator.
- Military version of the Localiser aerial system gives improved facilities for high speed aircraft.
  Increased range: freedom from site effects are main features.
- Fully automatic Fault Alarm, Remote Control and Changeover to Stand-by units ensure complete dependability.
- Test equipment "built-in."
- Glide Path and Localiser Beam Monitoring and correction facilities comply with latest I.C.A.O. requirements.
- Long life valves used in all Transmitters.

Telecommunications
CAMBRIDGE ENGLAND

Flight demonstrations of Pye I.L.S. will be given at Hatfield by courtesy of the De Havilland Aircraft Co. Ltd., during this year's Society of British Aircraft Constructors Exhibition.

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points to support the fuselage and apply loads to it.

A future projection for the tank includes an arrangement similar to that used by the British for water-testing the Comet. The wings will be attached to the fuselage and carried through the tank walls, with sealing at the areas of contact. With this arrangement, the wing panel can be deflected hydraulically to simulate flight-imposed and other loads.

In addition to the water pressure testing of the overall C-133 fuselage in the new tank, a separate cockpit section will be pressure-fatigue tested in a circular tank 37 ft. in diameter and 20 ft. deep. The walk platform around the top of the tank and viewing ports installed in the tank side will be used by observers during the pressure cycle run.

Red Star Takes Look At American VTOLs

Red Star, official organ of the Soviet Ministry of Defense, has shown a keen interest recently in Western—particularly American—progress in the development of vertical take-off fighters and convertiplanes. The Russian military newspaper noted the need for VTOLs and convertiplanes and then described American efforts:

"One of these (VTOLs) powered by a 5,850 hp. engine, completes a vertical take-off in 17 sec. and changes to a horizontal position at a height of 60 meters (slightly under 200 ft.). An experimental model helicopter-plane powered by a 450 hp. engine, develops a top speed of 280 kilometers per hour (about 175 mph.)" Presumably, the Russian paper was referring to the Convair Pogo and the Bell XV-3 respectively.

Survival in Atomic War Chicago Forum Topic

Business survival in the face of atomic attack will be discussed in a Nov. 17 conference sponsored by the Armour Research Foundation at the Illinois Institute of Technology, Chicago.

Industry, government and research experts will address the conference in an effort to establish priorities for the protection of selected operations within the individual companies as well as among industrial areas in the event of attack.

The conference will air such related problems as protection possibilities of underground construction, industry operation under emergency conditions, continuity of management and the location and preservation of vital records.

The Chance-Vought Regulus takes to the air. Precision actuating assemblies for this and other guided missiles are part of Ex-Cell-O's production.

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Almost every plane you see streaking across American skies, flies with Ex-Cell-O precision parts or assemblies—precision-built to fulfill ever more rigid design specifications.

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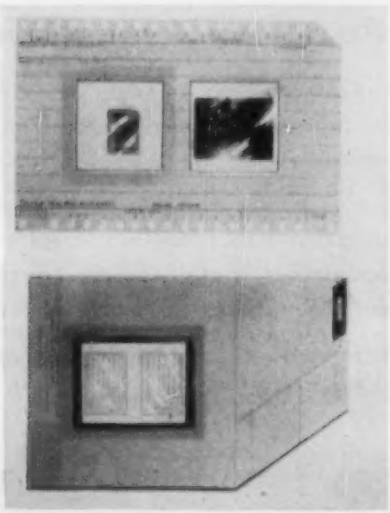
FILMSORT SURVEYOR projects film to 24x36-in. size. Other projectors are on market.

Handling of Drawings Streamlined

FILMSORT MOUNTER shown here can attach as many as 350 microfilm frames to punch cards within an hour.



SAMPLE CARDS with mounted microfilm. Punch card, top; visual card, below.

The combination of two common techniques—microfilms and punch cards—gives promise of great savings in the handling of engineering drawings.

It now costs one of the military services $15 to find, reproduce and refile a single engineering drawing, according to standards and methods specialists who studied the problem for the service. The new procedures, now in the pilot production stage, will bring the cost down to a few cents for an estimated annual saving of $10 million and numberless manhours. In most cases, it will be more economical to destroy the reproduction after each reference than to refile it.

Microfilmed copies of drawings or documents are mounted mechanically or manually on an "aperture" card developed by the Filmsort Division of the Dexter Folder Co., Pearl River, N. Y. The aperture card is either a standard type of punch card or a visual reference card with a cutout for the microfilm. Information pertinent to the drawings is punched, typed or written on the card.

If punch cards are used, they are run through a sorting machine when a particular drawing is desired. Visual-type cards are treated like any other hand-filed material. The cards take either 16 or 35-mm microfilm.

According to the Filmsort company, one of the military services will shortly amend its procedures to permit bidders to submit microfilmed copies of drawings with their proposals.

Many companies already have facilities for microfilming, photo-copying and punch-tabulating. For those that don't, most large cities have organizations which supply these services, Filmsort said.

Willys Gives Kaiser Control Over Avionics

Kaiser Aircraft and Electronic Corp., a wholly owned subsidiary of Willys Motors Inc., acquired the aircraft and electronic business conducted by the parent firm effective Sept. 1.

The following plants and operations are involved:

- **Richmond, Calif.** Machining of structural parts for the Boeing B-52 jet bomber and the KC-135 jet tanker at former Shipyard No. 2, now known as Richmond Machining Division, and industrial machining at former Shipyard No. 3.
- **San Leandro, Calif.** Manufacture of components for the Lockheed P2V patrol bomber at the Oakland Aircraft Division and marketing of the Kaiser Nest-A-Bin, an aluminum bulk materials container.
- **Palo Alto, Calif.** Laboratory research and development of cathode ray tubes and related electronic equipment.
- **Toledo, Ohio.** Engineering and manufacturing of electronic equipment in the guided missile and broadcasting fields.
- **Kaiser Aircraft and Electronics,** formerly Chase Aircraft Co., Inc., will continue to operate as suppliers to commercial and military customers.

Management and personnel at the five plants remain unchanged.

Small Businesses Get More Defense Awards

Small business received $315 million in Defense Department contract awards in May 1955.

The awards were above the average for the previous ten months, Thomas F. Pike, Assistant Secretary of Defense for Supply and Logistics, said. They amounted to 39.1% of the total net defense awards for the month and 26.8% of the new business awarded.

Pike warned that the May figures should not be taken as typical. He said the average share to small firms for the first five months of 1955 was 25.5%.

Certificate of Necessity For United Aircraft

United Aircraft Corp., East Hartford, Conn., has been granted a $954,000 certificate of necessity for aircraft engines and parts by the Office of Defense Mobilization with 55% of the amount allowed for rapid tax amortization.

Other recent certificates include:

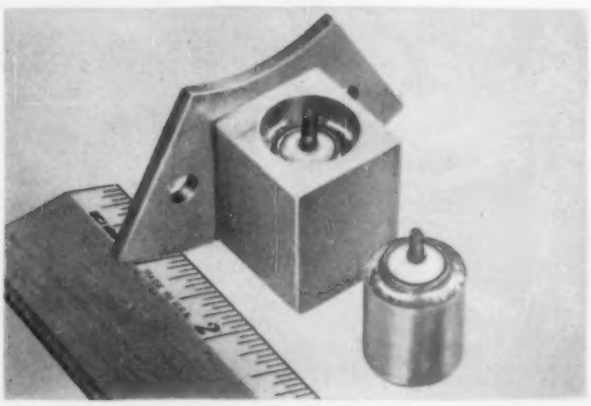
Kearfott Co., Inc., Little Falls, N. J., military aircraft instruments, $119,152 certified 65% allowed.

Ex-Cell-O Corp., Lima, Ohio, military en-

This is A. L. Paquette, manager of aircraft equipment field sales

Mr. Paquette supervises those engineers specifically assigned to aircraft electrical systems, system components and accessories. On his team are *The Men With The Facts*. Contact him or one of the men working with him by writing to Westinghouse Electric Corporation, Aircraft Equipment Department, Lima, Ohio. They can tell you why Westinghouse can offer you:

Now! Power without problems



Shown here is a high-temperature diode, the Westinghouse development that made possible the design of a high-performance generator that doesn't use commutators, slip rings, carbon brushes or grease-lubricated bearings. J-91024-A

For more information on this revolutionary a-c generator . . . turn the page ⟶

YOU CAN BE **SURE**...IF IT'S

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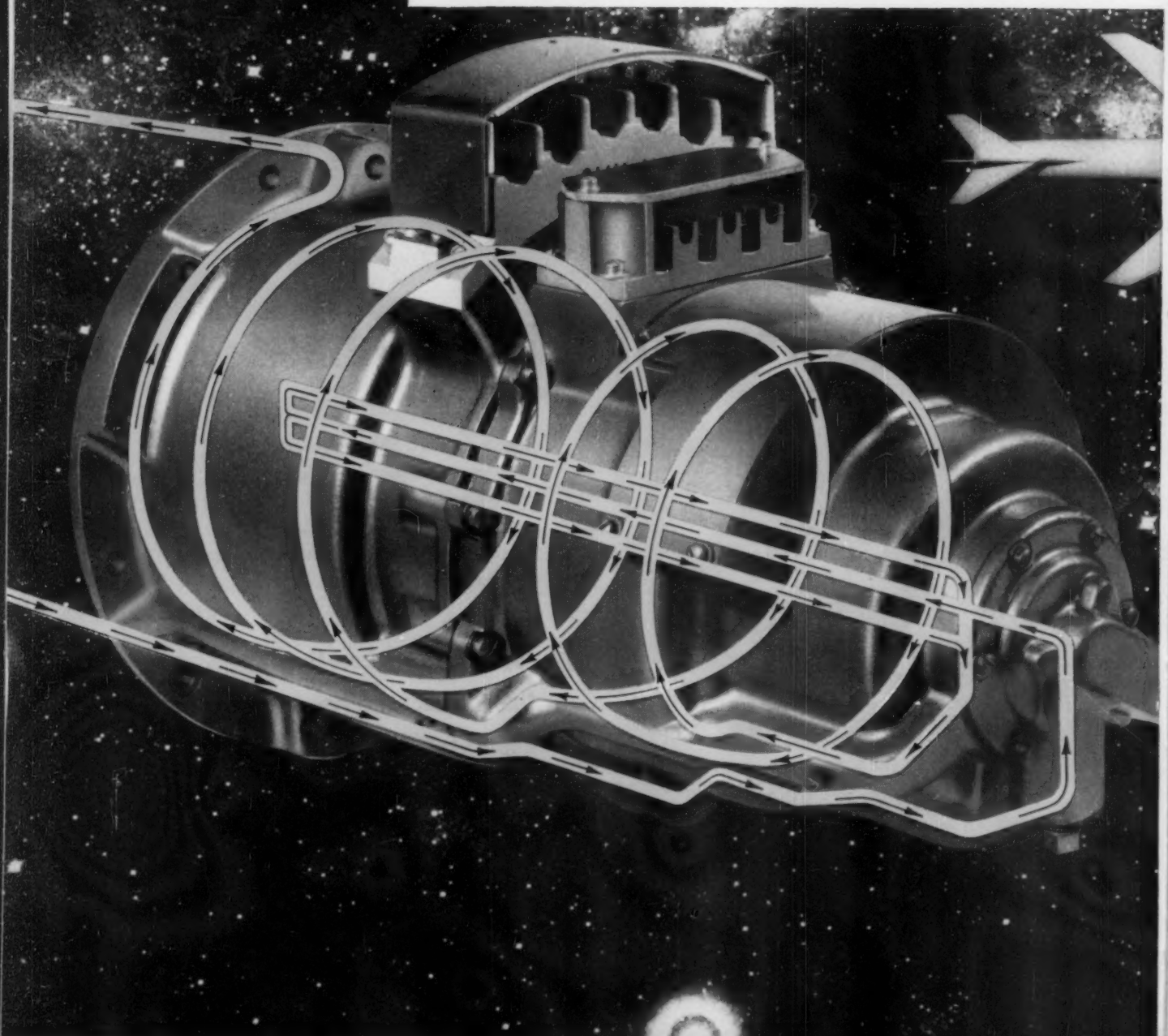
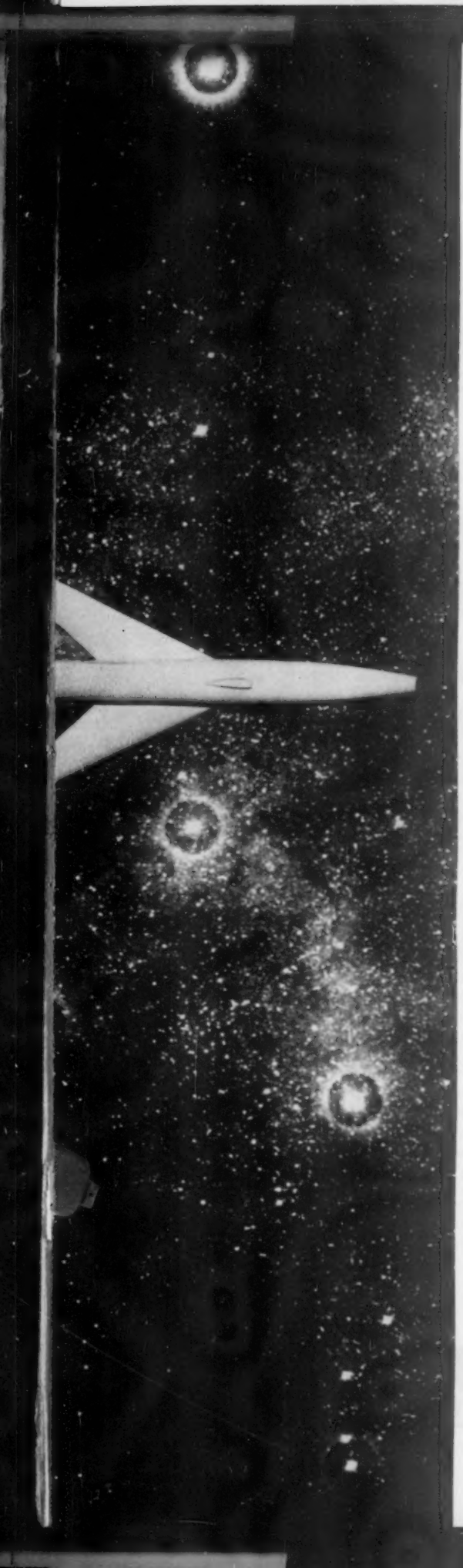
TOMORROW'S AIRCRAFT: *One step closer*

Now!

Power without problems





This revolutionary a-c generator is cooled and lubricated by engine oil . . . has no brushes, slip rings, commutator or grease-lubricated bearings . . . gives superior performance.

Westinghouse research in the field of semiconductors produced the high-temperature silicon diodes that are the key to the operation of this new generator. A-c power generated in the exciter armature is fed into the silicon rectifiers mounted on the generator shaft. The resulting d-c output supplies the main rotating d-c field.

Without brushes, aviation gas turbine engine oil can cool and lubricate the generator. Oil is pumped through the generator shaft, through tubes in the frame casting, and is used in the hydraulic constant-speed drive. All heat picked up by the oil is dissipated in the engine oil cooler. The generator operates safely with engine oil at temperatures up to 300 degrees Fahrenheit. All the usual generator trouble spots are eliminated—no brushes or commutating parts to wear, bearing lubricant is continuously replaced.

This is the first generator that is completely integrated with its drive, with the engine oil cooling system and with the balance of the electrical system. It is completely enclosed; there are no air tubes or ducts to occupy space and clutter up the airframe; all external oil seals are static and there is no overboard drainage of oil. No additional plumbing is required because the extension of the engine oil lubricating system is all internal. Now—aircraft altitude and speed will no longer be limited by the electrical system—a big step toward helping you bring tomorrow's aircraft . . . one step closer. J-91024-B

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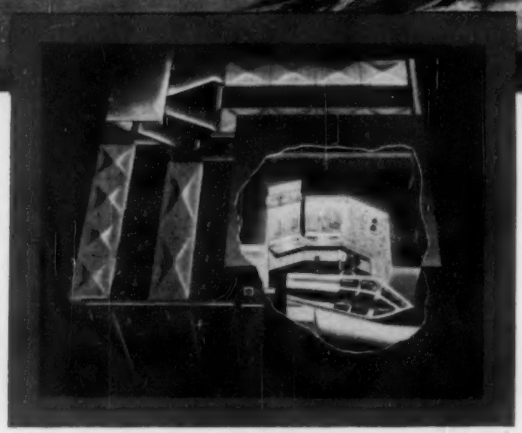
WHEREVER YOU FIND AIRPOWER, YOU'LL FIND LINK!



Developed under basic Link patents, the F-102 Jet Flight Simulator duplicates exact flight conditions of the famous Convair Delta-Winged Interceptor.

Link invites applications from qualified engineers and draftsmen.

Manufacturers of world-famous Link trainers and simulators (such as F3D, B-47, F-89, F2H-2, F2H-3) • simulated aircraft instruments specialized computers • servo mechanisms • computer components gear boxes • friction over-drive clutches • precision potentiometers ratio voltmeters • phase angle meters • and other electronic devices

An arsenal on wings, the USAF's newest jet fighter, the F-102, flies through space at supersonic speeds and packs the fighting punch of a thousand bolts of lightning!

But, new developments in aircraft make new demands on men. And, to help train the pilots who will fly this delta-winged jet in the defense of America, Link has developed the first F-102 jet flight simulator.

Months of research were necessary, but now, USAF pilots train on the ground in conditions precisely duplicating those of the plane's air performance. Electronically, the Link simulator re-creates all the actual flight characteristics of the F-102. Airmen will pilot a familiar craft when they first "hit the air" in this vital air-defense weapon.

As man shrinks horizons, Link keeps pace with progress. Wherever men are planning today to conquer tomorrow's skies, you'll find Link.

LINK AVIATION, INC.

BINGHAMTON, N. Y.

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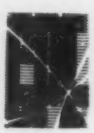

gine parts, $129,160 certified with 40% allowed.

Temco Aircraft Corp., Garland, Tex., military aircraft assemblies, $550,000 certified with 45% allowed.

Pheoll Manufacturing Co., Chicago, Ill., titanium aircraft rivets, $129,640 certified with 65% allowed.

Beech Aircraft Corp., Wichita, Kan., military aircraft, $123,326 certified with 65% allowed.

PRODUCTION BRIEFING

▶ **Air Cruisers Div.** of the Garrett Corp., Belmar, N. J., has been appointed by B. F. Goodrich Co. to fabricate Vulcafilm products. Vulcafilm is a new rubber product designed for simple fabrication of large rubber articles requiring oil-proof, high-strength construction.

▶ **Nuclear Development Associates, Inc.** has changed its name to Nuclear Development Corp. of America and is moving its offices to 5 New St., White Plains, N. Y.

▶ **First commercial production** and stocking of nylon web assemblies for jet overrun barriers has been undertaken by the Boyt Co., Des Moines, Iowa. Barriers consist of horizontal nylon web strap with 10,000-lb. tensile strength standing 39 in. above and 134 ft. across a 150 ft. wide runway.

▶ **Cowan Aircraft Associates,** 241 Clay St., San Francisco, has been appointed exclusive export distributor in Japan for synthetic rubber O-ring seals, manufactured by Parker Appliance Co., Cleveland.

▶ **An electronic fuel measurement system,** used on B-66s, B-47s, C-130s and other aircraft, has been named to the Military Qualified Products List as acceptable to the Air Force for use on combat planes. It was developed and produced by the Aeronautical Div. of Minneapolis-Honeywell Regulator Co.

▶ **Mallory-Sharon Titanium Corp.,** Niles, Ohio, recently shipped 15,000 lb. of the new titanium alloy MST-6Al-4V in 6½-in. billets. Shipment contained sufficient titanium to produce compressor disk forgings for 50 jet engines of a type which will utilize more titanium than any engine in use today.

The new alloy (6% aluminum, 4% vanadium, balance titanium) can be used at temperatures of up to 750F with minimum creep or change of properties.

▶ **The Society of Licensed Aircraft Engineers** moved its offices to 1 High St., Maidenhead, Berks., England.

▶ **Marquardt Aircraft Co.,** Van Nuys, Calif., is expanding its ceramic and

KAISER
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Subassembly of B-57 wing designed and fabricated for The Glenn L. Martin Company

WE WANT INTRICATE FABRICATIONS

We like the tough jobs. The ones that require design and development, engineering know-how and ingenuity, production capacity and experience. We're prepared to go all the way with you—from design to mass production—in a wide range of alloys, sizes and shapes.

On the mainline of the PRR, midway between Trenton, N.J., and Philadelphia, Pa.

FLEETWINGS DIVISION
KAISER METAL PRODUCTS, INC.
BRISTOL, PA.
IN THE HEART OF THE DELAWARE VALLEY

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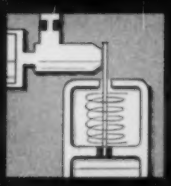

For the design, engineering and manufacture of electro-hydraulic servo valves and actuators.

MOOG

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PIONEER AIRPORT

EAST AURORA, N. Y.

cermet research to find materials that can withstand the high temperatures of sustained supersonic flight. Alan Levy, supervisor of materials and process section, is in charge of the new program.

▶**Electro Tec Corp.**, S. Hackensack, N. J., is constructing a 15,000-sq. ft. plant in Ormond Beach, Fla., for the manufacture of precision slip ring assemblies.

▶**Menasco Manufacturing Co.**, Burbank, Calif., has received orders from Lockheed Aircraft Corp. for the main landing gear of the 1649 Super Constellation.

▶**Acme Aluminum Alloys, Inc.**, Dayton, is undertaking a $500,000 expansion and renovation program designed to change its foundry to machine operations. Consolidation in one building is also planned.

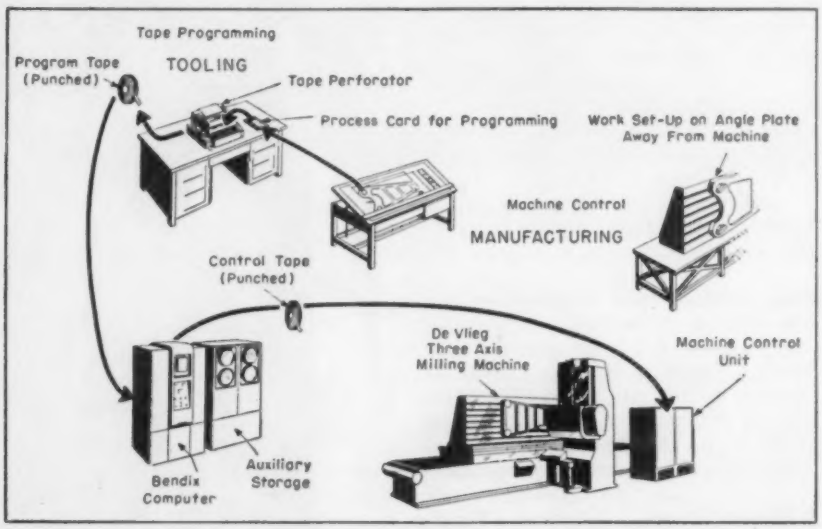
▶**Carrier Corp.** has established divisional status for its aircraft plant at Monrovia, Calif. The move was coincident with receipt of sub-contracts extending into 1957 for components of the North American F-86 Sabre and the Boeing KC-135 jet tanker.

▶**McDonnell Aircraft Corp.**, St. Louis, has awarded contracts amounting to more than $775,000 to Beech Aircraft Corp., Wichita, for auxiliary fuel tanks to be used on Navy's McDonnell F3H Demon jet fighter.

▶**Piasecki Helicopter Corp.** has leased approximately 9,000 sq. ft. of office space for its engineering division on Baltimore Pike, Springfield, Pa. The corporation also has acquired about 12,500 sq. ft. of additional parking area for its Ardmore plant.

▶**Hexcel Products Inc.**, formerly California Reinforced Plastics Co., manufacturers of structural honeycomb core materials used in aircraft and missile construction, has established an Eastern Division at 238 N. Franklingtown Rd., Baltimore 23, Md.

▶**M. J. Johnson Aircraft Engineering Co.**, Morris Plains, N. J., designers and manufacturers of aircraft controls and instruments, has purchased Borden Engineering Co., New Providence, N. J.

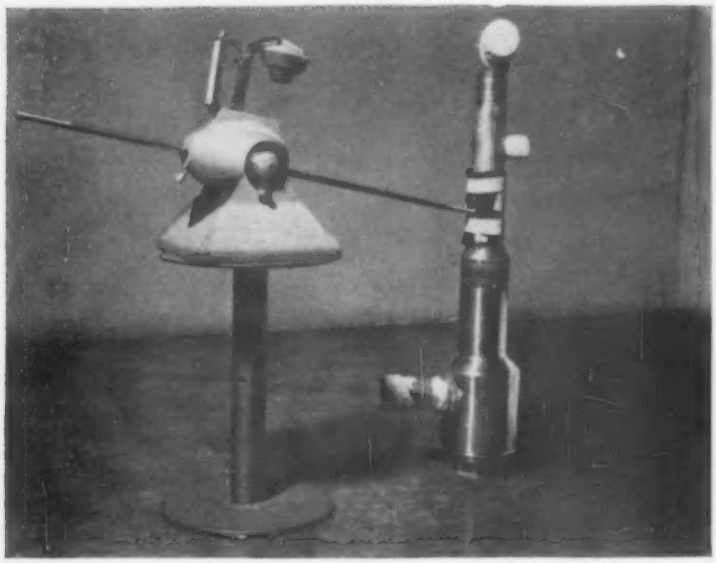


Martin Automates Precision Miller

Glenn L. Martin Co. is the latest aircraft manufacturer to announce automation of a production machine, with award of a contract to Bendix Aviation Research Laboratory, Detroit, for an electronic control system. The machine to be automated is a precision DeVlieg horizontal miller.

The project, sponsored by the USAF, is a production adaptation of the Numerical Control System developed at Massachusetts Institute of Technology.

This is how the automation setup will work: Tool engineers program machine operation on a tape perforator; program tape is fed into computer which converts information into control data punched on a machine control tape; data for cutting standard arcs and other routine movements are stored on magnetic tape in auxiliary storage unit, from which they are drawn by the director computer as needed; finally, the machine control tape guides movements of the milling machine cutter, through a machine control unit, to produce the part.



Welded pipe joint being radiographed with isotope camera using iridium 192.

It's piping with problems—

so every joint is welded—and

RADIOGRAPHED

THIS UNIT of a piping system is headed for duty never faced by piping before. High pressure? Yes. High temperature? Yes.

Critical work like this calls for welding—with radiography proving every weld sound.

Welding has a staunch friend in radiography.

In high-pressure piping, in the manufacture of pressure vessels, and in structural applications, radiography continues to open up new opportunities for welding.

Radiography can help you build business, and earn a reputation for highly satisfactory work.

If you would like to know more about what it can do for you, talk to your x-ray dealer.

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USAF Contracts

Following is a list of unclassified contracts for $25,000 and over as released by Air Force Contracting Offices:

ROME AIR FORCE DEPOT, N. Y.

Freeman Elec. Construction Co., Inc., 1409 E. Dominick St., Rome, N. Y., electrical alterations and additions to various bldgs. at Verona test Site, Verona, N. Y. and Griffiss AFB, Rome, N. Y., (IFB-30-635-55-155), job, $26,078.

Daystrom Electric Corp., 753 Main St., Poughkeepsie, N. Y., telegraph repeater unit, (IFB-30-635-55-4022), 30 ea., $138,317.

I-T-E Circuit Breaker Co., Special Products Division, 601 E. Erie Ave., Philadelphia 34, Pa., radar set group OA-703/CPN-18, (IFB RFP-30-635-55-4021), 81 ea., $262,180.

Eastman Kodak Co., 343 State St., Rochester 4, N. Y., film, 9½" X 370', type 1B, class N, (IFB RFP-30-635-55-4185), 4,360 rolls, $283,269.

General Aniline & Film Corp., Ansco Div., Binghamton, N. Y., film, 24", 30", ortho, vinyl base, 2,400 pkg.; film, 30" X 40", ortho, vinyl, base, 70 pkg., film, 40" X 52", ortho, vinyl base, (IFB RFP-30-635-55-4182), $122,642.

Di-Noc Co., 1700 London Rd., Cleveland, Ohio, film, 24" X 30", ortho, vinyl base, 3,600 pkg., film, 30" X 40", ortho, vinyl base; film, 40" X 52", ortho, vinyl base, (IFB RFP-30-635-55-4182), $166,626.

General Aniline & Film Corp., Ansco Div., Binghamton, N. Y., film 30" X 100', photographic, 800 rolls; film, 24" X 30", photographic, 260 pkg., paper, 20" X 24", 100 pkg., (IFB RFP-30-635-55-4188), $50,689.

Eastman Kodak Co. 343 State St., Rochester, N. Y., film, 9½ X 370', photographic, (IFB RFP-30-635-55-4187), 1,794 rolls, $11,891; film, 9½" X 370', type 1B, class N, 1,386 rolls; film 18½" X 46', type 1B, class N, 1,100 rolls, (IFB RFP-30-635-55-4176), $150,768.

Hyde Windlass Co., Bath, Me., turntable, radar set, MT-1173/FPN, (IFB RFP-30-635-55-5655), 45 ea. $647,460.

Parkchester Machine Corp., 204 Lafayette St., New York 12, N. Y., jumper cable, AB-3, 80 ea., jumper cable, ABI-24, 8 ea., jumper cable, AB-30, 80 ea. (IFB RFP-30-635-55-5049), $29,057.

Orradio Industries, T-120 Merrick Rd., Opelika, Ala., rolls of tape, 16,580 ea., empty reels, 3,252 ea., (IFB RFP-30-635-55-4010), $217,552.

Bendix Radio Div., Bendix Aviation Corp., Baltimore 4, Md., crystal oscillator calibrator, 85 ea., stalo checker, 2 ea., low voltage dummy load, 6 ea., (IFB RFP-30-635-55-5535), $52,846.

Consolidated Diesel Electric Corp., Stamford, Conn. power package for AN/FSP-14, (IFB RFP-30-635-55-5542), 200 ea., $2,504,-839.

Grant Photo Products, Inc., 18915 Detroit Ave., Cleveland, Ohio, paper, 10" X 10", type IE, contrast 2,300 pkg., paper 10" X 20", type IE, contrast 3, ,400 pkg., paper, 10" X 10", type IIE, contrast 2, 300 pkg., (IFB RFP-30-635-55-5174), $45,072.

Harvey Wells Electronics, Inc., North St., Southbridge, Mass., sound ranging set, AN/UNS-1, (IFB RFP-30-635-55-4020), 5,500 ea. $910,280.

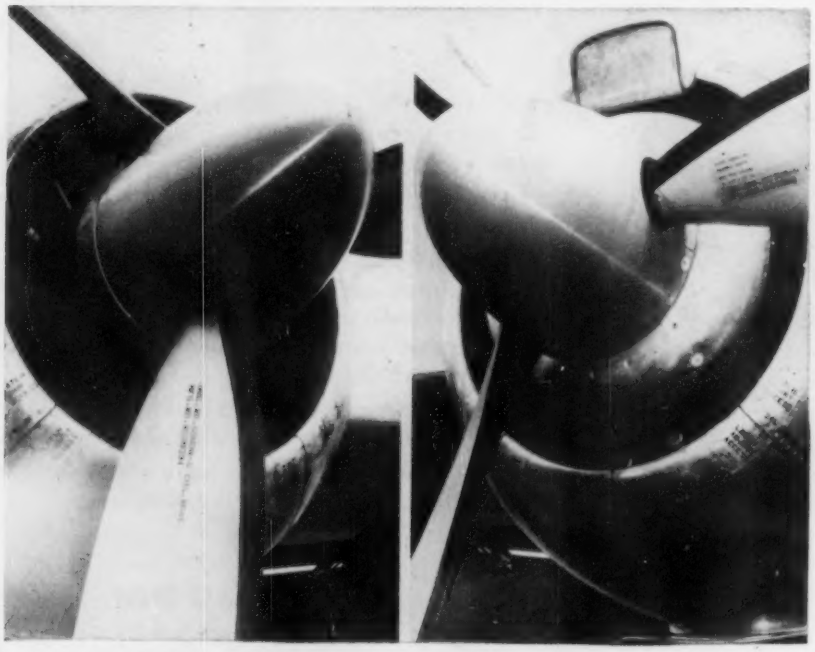
General Cable Corp., Railroad St., Rome, N. Y., cable-power, elec 4 cond., (IFB 30-635-55-81), 53,000 ft., $49,782.

Gilfillan Bros. Inc., 1815 Venice Blvd., Los Angeles 6, Calif., rack indicator, 13 ea., rack, 17 ea., (IFB RFP-30-635-55-5656), $185,305.

Stewart R. Browne Mfg. Co., Inc., 258 Broadway, New York 7, N. Y., flashlights, (IFB-30-635-55-164), 15,198 ea., $35,411.

Chatham Electronics, 630 E. Mt. Pleasant Ave., Livingston, N. J., tube, hydrogen, type 1257, (IFB-30-635-55-142), 24 ea., $34,560.

Tower Construction Co. 2700 Hawkeye Dr., Sioux City, Iowa, antenna AS-778/FRC, high power, low frequency, 300 ft., (IFB RFP-30-635-55-4019), 9 ea., $156,022.



New Nacelle for Super Connies

Redesigned Nacelle (picture on right) for Lockheed Super Constellation includes new air scoops and propeller afterbodies or "dishpans." (The original nacelle is shown at left.) Air scoop at top of Nacelle in righthand photo adds almost 1,000 ft. of critical altitude at maximum cruise power settings by eliminating more complicated air channel previously used. The afterbodies are now standard equipment on model 1049G Super Constellations and have been retrofitted on a number of 1049C and 1049E models. They increase cruise speeds by 2 mph. by reducing air flow separation and consequent drag.

DAYTON AIR FORCE DEPOT, Ohio.

Testa Manufacturing Co., 10130 East Rush St., El Monte, Calif., collimator, vertical, 17 ea., $28,446.

Westinghouse Electric Corp., 32 North Main St., Dayton, Ohio, reproducible copy for handbook of operation and service instructions and reproducible copies for illustrated parts breakdown covering test sets, 1JD661-G1, 1JD662-G1, 1JD6663-G1, 1JD-658-G1, 1JD660-F1, 1JD655-F1, 1JD664-G1, 1JD665-G1 1JD666-G1, 1JD667-G1, 1JD-668-G1, T31775 1 ea., (IFB PR 204352), $77,890.

Commercial Research Laboratories, Inc., 20 Bartlett Ave., Detroit, 3, Mich., electronic counter adapter kit, 23 ea., (IFB RFP 33-604-55-3833) $35,105.

General Electric Co., One River Road, Schenectady 5, N. Y. tube, electron, transmitting, triode, general purpose, JAN type 3C22, (IFB RFP 33-604-55-1507), 1,814 ea., $339,218.

Control Products Inc., 306 Sussex St., Harrison, N. J., switch, thermostatic, 6,000 ea., (IFB PR 561914), switch, thermostatic, 12,680 ea., (IFB PR 561970), $192,964.

Phaostron Co., 151 Pasadena Ave., South Pasadena, Calif., mutimeter TS-352A/U, 565 ea., maintenance spare parts, (IFB RFP 33-604-55-3696), $42,117.

Radio Condenser Co., Davis and Capewood Sts., Camden 7, N. J., capacitor, variable, air dielectric, 300 ea., (IFB PR 588808), $26,771.

Raytheon Manufacturing Co., 100 River St., Waltham, Mass., transformer, power, 40 ea., 100 ea., 80 ea., 100 ea., transformer pulse, 100 ea., (IFB RFP 33-604-55-3462), $26,724.

Tektronix, Inc., Portland, Ore., oscilloscope, contractor's model 315D, (IFB PR 410638), 85 ea., $61,523.

Testa Manufacturing Co., 10130 East Rush St., El Monte, Calif. sextant mount, collimator, contractor's P/N D-2218 with floor-type stand, (IFB PR 659562), 18 ea., $25,051.

Trad Electronics Corp., 1001 First Ave., Asbury Park, N. J., signal generator AN/GRM-4, 198 ea., (IFB RFP 33-604-55-2918) $169,297.

Western Electric Co., Inc., 120 Broadway, New York 5, N. Y., reproducible copy for handbook of operation, service and repair instructions on electronic test equipment, 4 ea., 6 ea., 6 ea., 10 ea., (IFB PR 560992 and amend. no. 1) $721,290.

WARNER ROBINS AIR MATERIEL AREA, Ga.

Sheridan-Pumaro Co., P. O. Box 1333, Macon, Ga., modification of bulk supply warehouse, (IFB-87—local purchase), job, $223,136.

N. M. Bentley, 613 Carmen Place, Macon, Ga., painting exterior and interior of buildings, (IFB-88—local purchase) job, $138,-853.

Smith Electric Co., P. O. Box 134, Opelika, Ala., alterations for expansion of grinding and machine shop bldg., (IFB-96—local purchase), job, $32,420.

Electronic Tube Corp., 1200 E. Mermaid Lane, Philadelphia 18, Pa., cathode ray electron tube, type 5 FP14A, 2,200 ea., (RFP 1238), $28,600.

Packaging Industries Ltd., Inc., 50 Church St., Montclair, N. J., heat sealing machines, (RFP-1337, bench type, size 12, type 2, 99 ea., bench and/or portable type size 12, type 3, 80 ea.), export packed, $164,305.

Cleveland Lathe and Machine Co., 5400 Brookpart Rd., Cleveland 29, Ohio, heat sealing machines, (RFP-1337, portable type, size 6, type 1 157 ea.), export packed, $69,912.

Heyer Products Co., Inc., 471 Cortlandt St., Belleville 9, N. J., metallic rectifier, portable, trainer power supply, direct current, type F-1, export packed, 364 ea., (AFP-1349), $93,318.

Barrett Equipment Co., 2101 Cass Ave., St. Louis 6, Mo., grinding machine for brake shoe lining, portable, heavy duty, size 2, 115 ea., (RFP-1320), $46,359.

Parker Appliance Co., 17325 Euclid Ave., Cleveland 12, Ohio, tube flaring and beading machine, mechanical type, bench mounted,

To Produce Jet Engine Blades of Superior Quality—Eaton Developed its famous ROLL-FORM Process

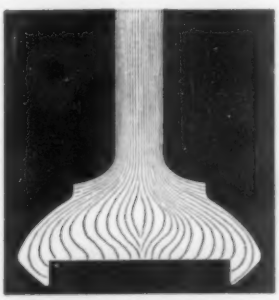


Illustration of section through root of an Eaton Roll-Form titanium blade, showing the excellent flow lines characteristic of this process.

In the Eaton Roll-Form process of producing jet engine blades—a process originated and perfected by the Eaton Manufacturing Company—the complex curves of the blade surfaces are formed by simple rolling operations, in which the grain structure of the metal is rolled to conform to the blade contour. The Eaton Roll-Form blade thus produced combines high fatigue strength and required tolerances—and is made with the most economical utilization of costly raw material.

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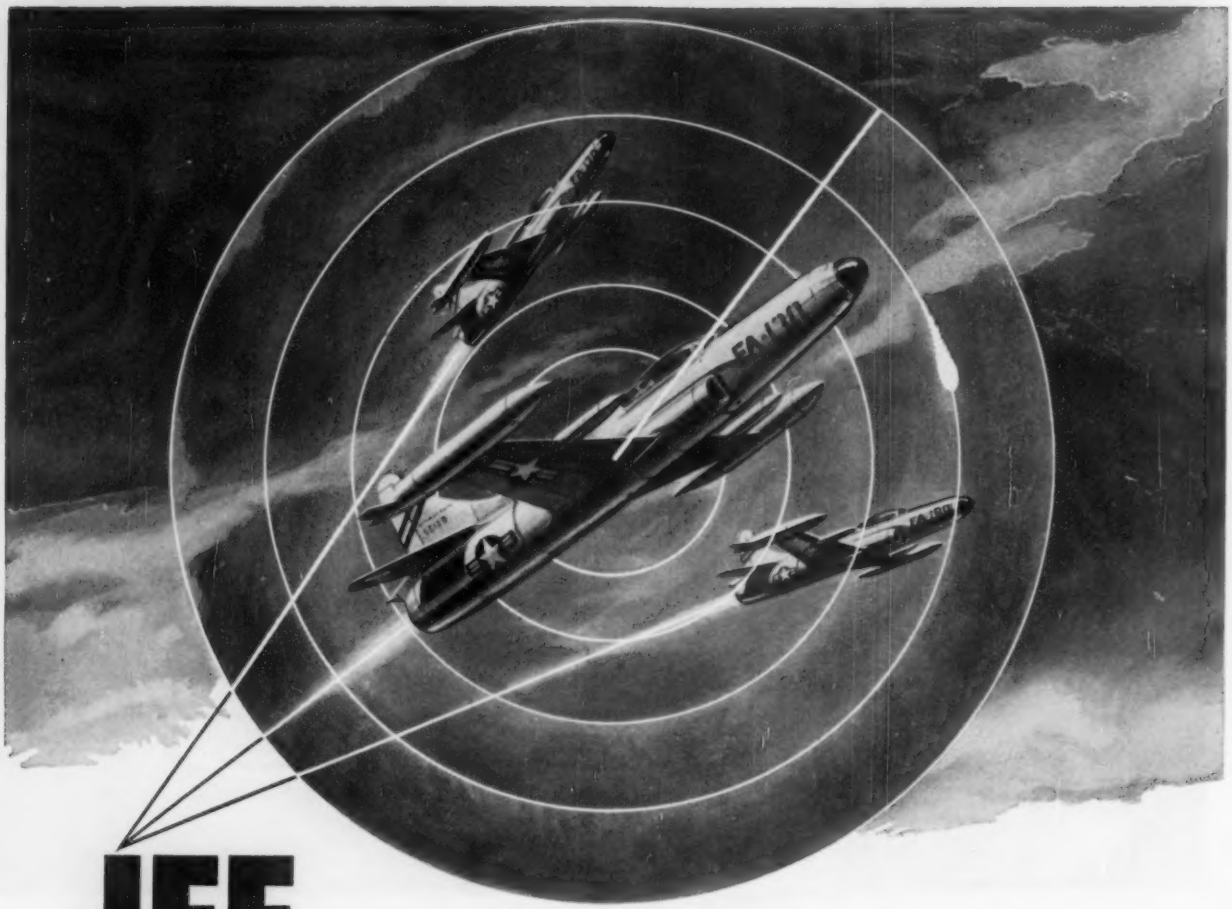

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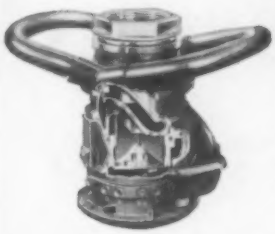
NO. 4083

Has aluminum elbow; qualified for military use.

Patented 2,665,925
2,665,926

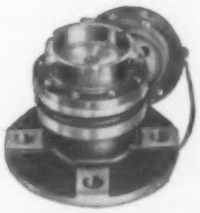
NO. 4093 SELF-SEALING HYDRANT VALVE



Aside from stirrup handles, No. 4093 is like No. 4092 Fueling Nozzle. Used widely in hydrant systems for pipe lines with pits or above ground.

Patented 2,665,925
2,665,926

NO. 4096C HYDRANT ADAPTER



Sturdy brass construction, 2½" standard flange, generally installed in manhole or pit on apron. Used in conjunction with No. 4093, combination can be used for fueling or defueling.

NO. 4082 OIL SERVICING NOZZLE

Also designed and built to military specifications, this nozzle delivers lubricating oil to aircraft. Features positive shut-off, non-drip valve in end of tube. Easily removable 60-mesh brass wire strainer.

NO. 775M AIRCRAFT REFUELING NOZZLE (OVER-WING)

Has passed rigid tests under adverse conditions to qualify for satisfactory refueling of military airplanes. Widely used at commercial airports. Brass or aluminum.

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Please send details on ☐ No. 4092, ☐ No. 4083, ☐ No. 4093, ☐ No. 4082, ☐ No. 775 M.

NAME_____

TITLE_____

ADDRESS_____

CITY_____ STATE_____

29 ea., export packed, (RFP-1419), $51,521.

Davey Compressor Co., Kent Ohio, air compressor, gasoline-engine driven, 15 cfm, 200 psi, type MC-2, 250 ea., export packed, (RFP-1159), $193,875.

Indianapolis Machinery and Supply Co., 1959 S. Meridian St., Indianapolis 6, Ind., shaper, metal cutting, 24 in. horizontal, type 1, size 4, 25 ea., (RFP-1348), $78,750.

McColpin-Christie Corp., 3410 E. 67th St., Los Angeles 43, Calif., metallic rectifier, portable, type B-9, 46 ea., export packed, (RFP-1426), $33,534.

AIR RESEARCH & DEVELOPMENT COMMAND, BALTIMORE, Md.

A. O. Smith Corp., P. O. Box 584, Milwaukee 1, procurability study for aircraft designer's manual, (IFB AF(600)-1513), $85,201.35.

University of Pittsburgh, Pittsburgh, continuation of research studies on anti-ferromagnetic resonance, paramagnetic resonance in phosphors, foreign atoms in silver halides and nuclear resonance, (IFB AF 18(600)-892), $84,890.

Board of Trustees of the Leland Stanford Jr. University, Stanford, Calif., continuation of research on electron scattering and nuclear structures, (IFB AF 18(600)-646), $68,260.

Board of Trustees of the Leland Stanford Jr. University, Stanford, Calif., continuation of research on nuclear photo effects, meson fields, and electron scattering, (IFB AF 18(600)-545), $40,000.

Board of Trustees of the University of Illinois, Urbana, continuation of research on conducting thin film studies, (IFB AF 33-(038-21255), $38,055.

John Hopkins University, 34th and Charles Sts., Baltimore 18, research in boron hydride chemistry, (IFB AF 18(600)-1526), $50,139.

Loewy Construction Co., 350 Fifth Ave., New York 1, development of illustrated manual for plastic forming of aircraft components, (IFB AF(600-1510), $101,000.

Northrop Aircraft, Inc., Northrop Field, Hawthorne, Calif., analytical study to determine outcome of combat between various fighter and bomber aircraft, (IFB AF 18-(600)-1491), $110,504.59.

California Institute of Technology, Pasadena 4, Calif., research on "panel flutter," $25,873.

New York University, Graduate School of Arts & Science, Dept. of Physics, Washington Square, New York 3, investigation of persistent interior polarization, (IFB AF 18(600)-1004), $25,000.

Trustees of Columbia University in the City of New York, Box 6, Low Memorial Library, New York 27, continuation of research on the nature of fracture in metals, (IFB AF 18(600)-898), $25,000.

Board of Trustees of the University of Illinois, Urbana, research on electronics and ionic properties of non-metallic crystals, $58,211.

Trustees of Princeton University, Princeton, N. J., continuation of research on laminar and turbulent boundary layers and transition at supersonic speeds, (IFB AF 18(600)-498), $214,338.

WRIGHT-PATTERSON AIR FORCE BASE, Ohio

Avco Manufacturing Corp., Crosley Div., 2630 Glendale, Milford Road, Cincinnati, radio receivers, mountings, spare parts, special tools and data, (IFB PR GE-561414, GE-561434, PE-158655, PE-156745, MIPR R-55-2659-127-AER, $1,303,037.

Hallicrafter's Co., 5th and Kostner Ave., Chicago, transmitter, radio, T-465/ALT-7, 108 ea., power supply, PP-506/APT-6, 782 ea., (IFB PR GE-553550), $2,903,204.

Mitchell Camera Corp., 666 West Harvard St., Glendale 4, Calif., motion picture camera, 35-mm., Hi-speed, 26 ea., (IFB PR 569808, PR 599984), $195,848.

Sperry Gyroscope Co., Great Neck, Long Island, N. Y., amplifier, MA-4, 94 ea., installations, spare parts and data, (IFB PR-PE 177959), $388,677.

Cessna Aircraft Co., Wichita, aircraft, L-19A, 100 ea., spare parts, special tools, ground handling equipment, (IFB MIPR R-55-531-AVD-RP), $438,992.

Speery Gyroscope Co., Great Neck, Long Island, controller, turn, remotely operated, type E-4, 69 ea., motor and drive assembly, servo, type A-1, 19 ea., (IFB PR MA-45754), $33,469.

Fairchild Camera and Instrument Corp., Robbins Lane, Syosset, Long Island, N. Y., lens bodies, LA 28, 6-inch cone, 12 ea., magazines, LA 30, 316 ea., carrying cases, type I, 1,256 ea., spare parts, (IFB MIPR R-55-959-152-Aer), $836,207.

Trad Television Corp., 1001 First Ave., Asbury Park, N. J., adapters, spare parts and data, (IFB PR GE-557624), $427,714.

Eastman Machine Co., Buffalo, N. Y., motor assemblies, 4289-BM517-2, 101 ea., (IFB PR SA-545853), $33,869.

Bevelite Corp., 1615 Cordova St., Los Angeles, aircraft model, plastic, badger, 1,812 ea., aircraft model, plastic, USAF RB-52B, 1,812 ea., aircraft model, plastic, USAF F-101A, 1,812 ea., mold, 1 ea., (IFB PR 00-497236, MIPR R-17-55-ONR), $67,-667.

General Motors Corp., AC Spark Plug Div., Flint 1, Mich., bombing system, 35 ea., spare components, spare parts, maintenance tools and test equipment, (IFB PR 177969), $3,984,787.

Lear, Inc., 110 Ionia Ave., N. W., Grand Rapids, Mich., power units, P/N 108AB3A, 369 ea., (IFB PR 545854), $84,061.

Forway Industries, Inc., 122 Green Ave., Woodbury, N. J., mounting bases, MT-236B/ARC-3, MT-237/ARM-3 and MT-238C/ARC-3, (IFB PR GE-580154), $41,-085.

Trad Television Corp., 1001 First Ave., Asbury Park, N. J., components of AN/ARN-12, spare parts and data, (IFB MIPR R-02-590169-SC-01-23), $52,543.

Federal Manufacturing and Engineering Corp., 211 Steuben St., Brooklyn 5, N. Y., projection set, 16-mm. motion picture, sound, 22 ea., (IFB MIPR R-55-565-1893/Bu Ships), $38,352.

Collins Radio Co., 835 Thirty-Fifth St., N. E., Cedar Rapids, Iowa, radio set, AN/ARN-14, (IFB PR GE-561435, GE-561420, PE 158653, PE-158741), $3,384,604.

General Electric Co., Specialty Heating Equipment Section, 2900 Campbell Ave., Schenectady, N. Y., camera covers, electrically heated, type B-13, 1152 ea., camera covers, electrically heated, type B-16, 76 ea., camera covers, electrically heated, type B17, 72 ea., camera covers, electrically heated, type B-19, 66 ea., (PR MO-570051 and MO-570027), $202,960.

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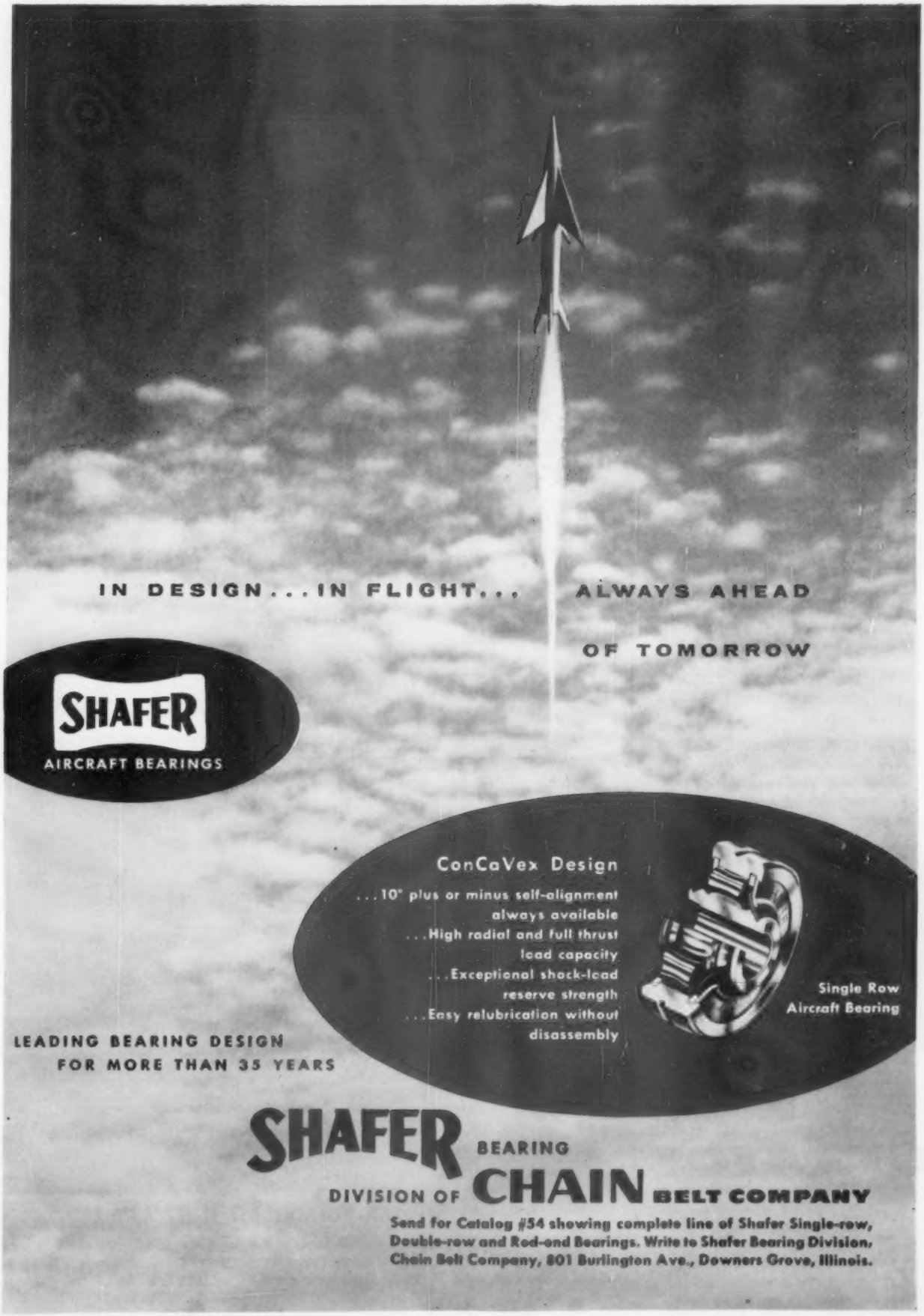
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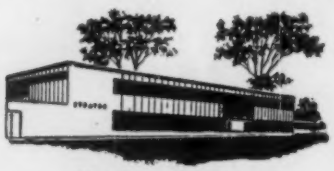

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Army Contracts

Following is a list of unclassified contracts for $25,000 and over as released by Army Contracting Offices:

LOS ANGELES ORDNANCE DISTRICT, Pasadena 2, Calif. July 14.

Harvey Machine Co., Inc., 19200 South Western Ave., Torrance, Calif., redesign and development of fuze, rocket, BD, M404A1, project PA-5-2, job, $39,011.

Gilfillan Bros., Inc., 1815 Venice Blvd., Los Angeles 6, Calif., overrun of cost, job, $249,000.

G. O. Noville and Associates, Inc., 906 S. Robertson Blvd., Los Angeles 35, Calif., subcontracting, 15.3%, ammunition disposal systems for M48 tank, job, $28,312.

Courtland Labs, 1600 N. Bonnie Beach Place, Los Angeles 63, Calif., Nike I starting mixture, job, $46,804.

California Institute of Technology, 1201 E. California St., Pasadena, Calif., subcontracting 20%, engineering research and development, job, $163,341.

International Telemeter Corp., 2000 Stoner Ave., Los Angeles 25, Calif., subcontracting, 11%, magnetic memory device, job, $54,100.

Grand Central Rocket Co., P. O. Box 111, Redlands, Calif., loading of T225 rocket motors, job, $46,138.

Regents of the U. of Calif., Berkeley, Calif., research in numerical analysis, job, $30,000.

Douglas Aircraft Co., Inc., 3000 Ocean Park Blvd., Santa Monica, Calif., supplies and services relating to the Honest John Missile, job, $30,000.

California Institute of Technology, 1201 E. California St., Pasadena, Calif., subcontracting, 78%, engineering research and development, job, $940,000.

Harvey Machine Co., Inc., 19200 South Western Ave., Torrance, Calif., fin assembly, T12 for 81MM mortar, 2,000 units, $301,000.

Firestone Tire & Rubber Co., 2525 Firestone Blvd., Los Angeles 54, Calif., subcontracting, 17%, revision of JPL handbook, 5,000 ea., $36,065.

University of Utah, Salt Lake City 1, Utah, fundamental investigation of factors affecting air and ground shock propagation from large blasts over long distances, job, $35,000.

Harvey Machine Co., Inc., 19200 South Western Ave., Torrance, Calif., projectile, TP, T328, 30MM, 438,000 ea., $218,124.

Northrop Aircraft, Inc., 500 E. Orangethorpe Ave., Anaheim, Calif., subcontracting, 45%, repair and modification of T46E1 range finders, 250 ea., $265,627; subcontracting, 50%, repair and modification of T179 series telescope mounts, 555 ea., $532,860; subcontracting, 98%, counter assemblies in accord. with ordnance Dwg. No. F8295203, 80 ea., $40,469; subcontracting, 50%, maintenance test fixtures, 14 ea., $47,834; subcontracting, 25%, procurement of identical items now under contract, various, $106,952; subcontracting, 25%, spare parts, telescope T149E2, various, $342,641.

Navy Contracts

Following is a list of unclassified contracts of $25,000 and over as released by Navy Contracting Offices:

AVIATION SUPPLY OFFICE, PHILADELPHIA. July 12.

Benjamin Moore & Co., 511 Canal St., New York 13, N. Y., enamel, 15,000 gal., $35,850.

Bell & Howell Co., 7100 McCormick Rd., Chicago 45, Ill., camera sets, 22 ea., $36,632.

Turco Products, Inc., 95 Fairmount Ave., Philadelphia 23, Pa., compound, 35,100 gal., $48,069.

Eastman Kodak Co., Rochester 4, N. Y., film, various, $58,709.

Benjamin Franklin Paint & Varnish Co., 4820 Langdon St., Philadelphia 24, Pa., enamel, various, $81,300.

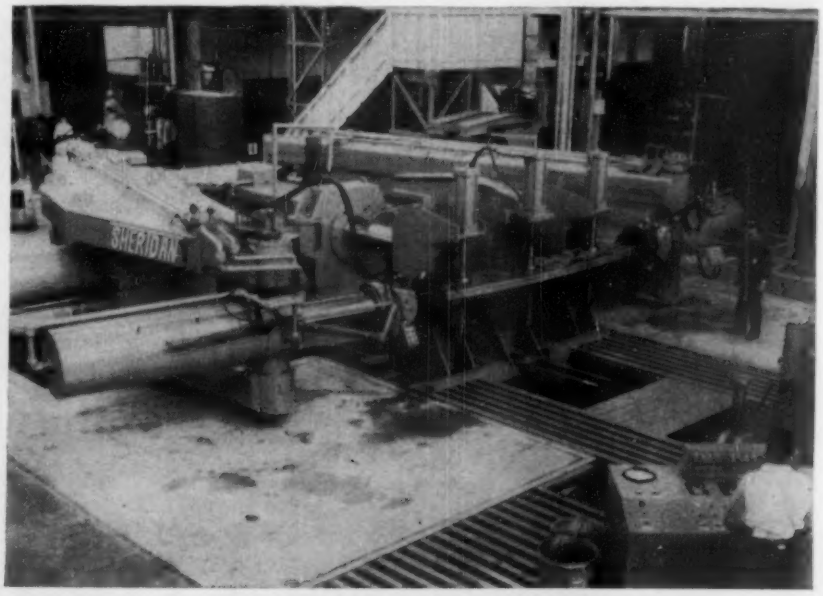
Red Bank Div., Bendix Aviation Corp., Eatontown, N. J., armature assy., 1,018 ea., $84,799.

Weston Gear Works, 2600 E. Imperial Highway, Lynwood, Calif., gear box, 257 ea., $143,817.

Goodyear Tire and Rubber Co., Inc., 1144 East Market St., Akron 16, Ohio, wheel assys., 555 ea., $38,589.

Westinghouse Electric Corp., 3001 Walnut St., Philadelphia, Pa., power units, various, $103,362.

Bendix Products Div., Bendix Aviation



Stretch-Former for B-52

Huge Sheridan stretch-forming machine in operation at Boeing's Wichita plant is used for contouring extrusions, sheet and rolled sections for the B-52 Stratofortress. It forms sheets up to 6 ft. wide by 24 ft. long, with a tension cylinder capacity of 300 tons. It will handle extrusions and rolled sections up to 24 ft. long. Machine has 600-ton bulldozer for reverse contouring, degree changing and joggling of parts.

VICKERS "Instant Response"* HYDRAULIC MOTOR ... THE AIRCRAFT HANDY MAN

*Called "Instant Response" because it starts, stops or reverses almost instantaneously.

Vickers Constant Displacement Piston Type Hydraulic Motors are available in 24 sizes for 3000 psi.

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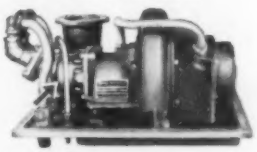
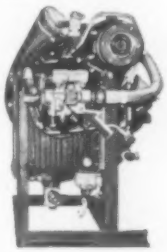
AERIAL REFUELING PUMP DRIVE



Fuel Transfer Pump built by Nash Engineering Co. for Boeing KC-97 Tanker. Powered by Vickers "Instant Response"* Hydraulic Motor.

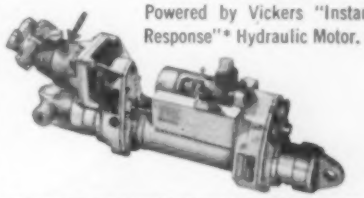
CABIN SUPERCHARGING

Douglas DC-7 Cabin Supercharger is driven by Vickers "Instant response"* Hydraulic Motor.

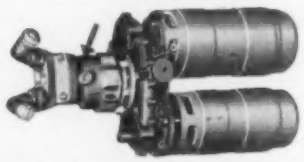


HORIZONTAL STABILIZER ACTUATOR

Built for Grumman F9F6 by Cleveland Pneumatic Tool Co. Powered by Vickers "Instant Response"* Hydraulic Motor.



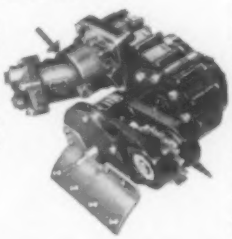
ALTERNATOR GENERATOR DRIVE



Alternator Generator Drive for Convair T-29 uses Vickers "Instant Response"* Hydraulic Motor.

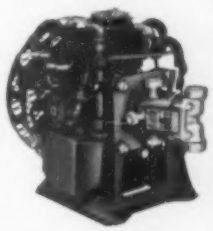
TELESCOPING BOOM ACTUATOR

Built by Jack & Heintz to extend and retract boom for in-flight refueling. Driven by a Vickers "Instant Response"* Hydraulic Motor.



AIR COMPRESSOR DRIVE

Built by Walter Kidde & Company, Inc. and driven by Vickers "Instant Response"* Hydraulic Motor.



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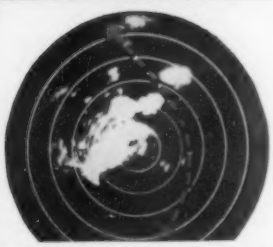
In terms of time saving and increased passenger comfort, the RCA AVQ-10 weather radar is more and more becoming a "must" among air lines. With it, pilots can "see" into storm areas many miles ahead and pick non-turbulent paths between them, often making long and costly detours unnecessary.

RCA is proud that these distinguished air lines have chosen the AVQ-10 to save time and increase passenger comfort. Every effort will be made to meet additional commitments occasioned by the great and growing demand for this equipment. To assure early installation, other air line and private operators are invited to write immediately for further particulars on the RCA AVQ-10. Overseas customers should get in touch with the RCA International Division, 30 Rockefeller Plaza, New York City, or any RCA International Distributor.



Dotted line shows how airplane passed between storm cells in its flight path.

Minutes and miles are saved when a pilot is able to find a smooth path through turbulent areas.

AVQ-10 antenna mounted in nose of airplane scans the forward areas, enabling the pilot to evaluate storm conditions far ahead.

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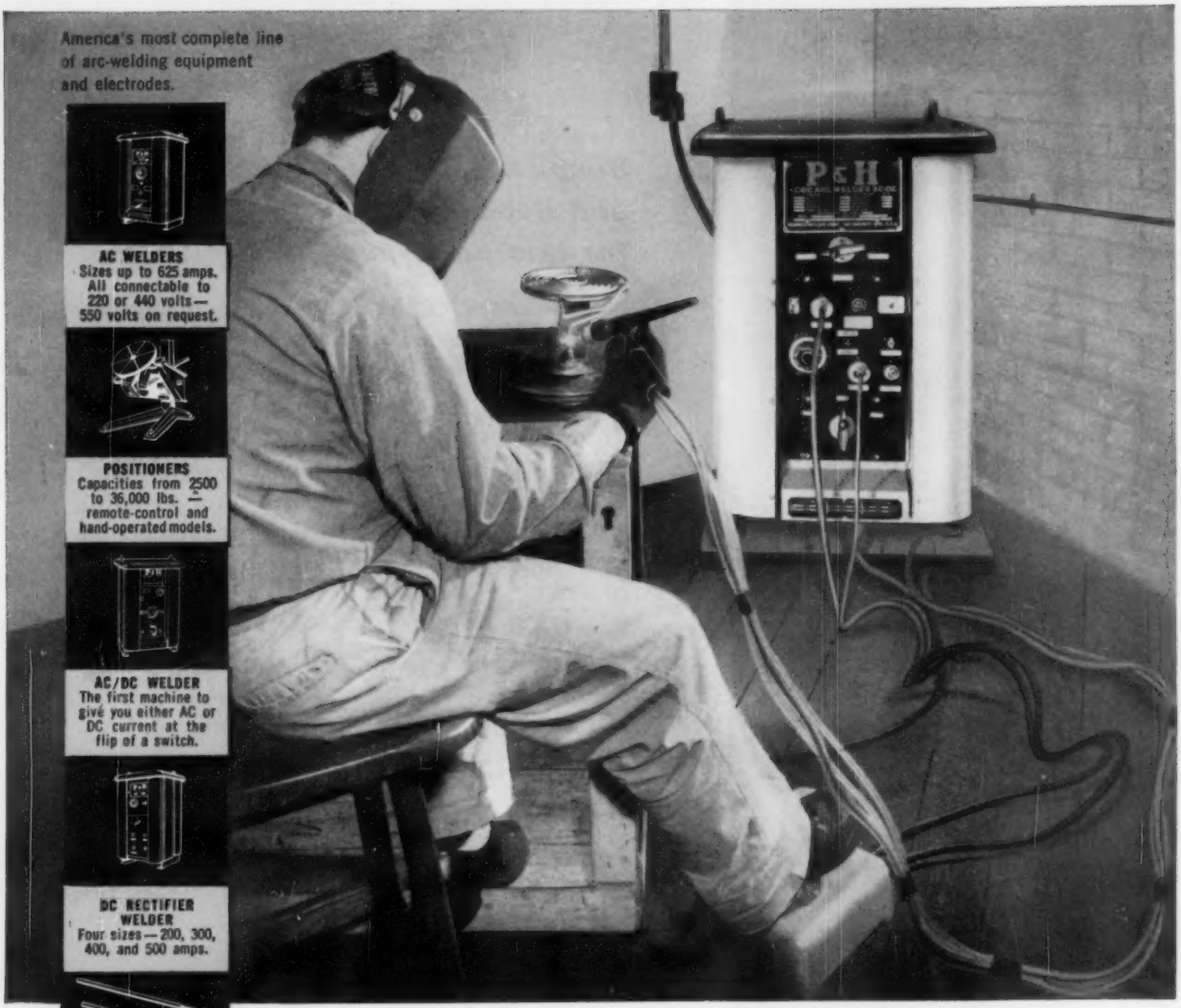

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"This new AC/DC P&H Welder beats anything we have ever used." That's what Lawrence Beggs of the Research Weld Co., Racine, Wisconsin, says.

"Ours is mostly precision work," Mr. Beggs continues, "involving Heliarc* welding of stainless, aluminum, and magnesium. We can switch from DC for welding stainless to AC for aluminum or magnesium, as easily as turning on a light. With its automatic high-frequency and instant response to control, this machine is wonderfully easy to use. We have had new men make acceptable welds with it after just a few minutes' instruction."

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Eclipse-Pioneer Div., Bendix Aviation Corp., Teterboro, N. J., adapters, 115 ea., $116,796.

New York Rubber Corp., 100 Park Ave., New York 17, N. Y., kits: pararaft, (IFB-383-997-55), 1,300 ea., $79,274.

New West Paint & Chemical Co., 1150 Revere Ave., San Francisco, Calif., paint, (IFB-383-853-55), various, $54,540.

Hub Paint & Varnish Co., Inc., 47-38 Fifth St., Long Island 1, N. Y., paint, (IFB-383-867-55), 40,000 gal., $53,560.

Atlas Paint & Varnish Co., 32-50 Buffington Ave., Irvington 11, N. J., paint, (IFB-383-867-55) 30,000 gal., $38,850.

Van Brode Milling Co., Inc., Clinton, Mass., distillation kits, (IFB-383-1057-55), 3,750 ea., $32,250.

General Electric Co., 1405 Locust St., Philadelphia 2, Pa., power supply units, (IFB-383-774-55), 16 ea., $28,635.

Hamilton Standard Div., United Aircraft Corp., Windsor Locks, Conn., overhaul of propeller blade assemblies, 171 ea., $155,008.

Airborne Accessories Corp., 1414 Chestnut Ave. Hillside, N. J., gear boxes and actuators, various, $156,255.

Piasecki Helicopter Corp., 100 Woodland Ave., Morton, Pa., maintenance parts used on HUP aircraft, various, $173,904.

Sigmund Eisner Co., 2-39 Bridge Ave., Red Bank, N. J., coveralls, various, $252,000.

Garrett Corp., 9851-9951 Sepulveda Blvd., Los Angeles 45, Calif., maintenance parts used on air turbine compressors, various, $328,380.

Aviators Clothing Co., Inc., 143 Main St., Beacon, New York, coveralls, various, $512,490.

Garrett Corp., 9851-9951 Sepulveda Blvd., Los Angeles 45, Calif., valve assys., various, $25,065.

General Electric Co., 1405 Locust St., Philadelphia 2, Pa., indicators, 34 ea., $35,382.

Lord Mfg. Co., 1635 West 12th St., Erie 6, Pa., isolators, various, $38,141.

Philco Corp., 18th & Courtland Sts., Philadelphia 40, Pa., rough drafts for various manuals, $51,925.

Hamilton Standard Div., United Aircraft Corp., Windsor Locks, Conn., services & materials to repair propeller blades, 127 ea., $83 549.

Grumman Aircraft Eng. Corp., Bethpage, Long Island, N. Y., maintenance parts for SA-16A aircraft, various, $84,577.

Garrett Corp., 9851-9951 Sepulveda Blvd., Los Angeles 45, Calif., maintenance parts used on gas turbine compressors, various, $130,753.

Sundstrand Aviation Div. Sundstrand Machine Tool Co., 2421 11th St., Rockford, Ill., maintenance parts used for transmission & governor assys., various, $146,696.

Garrett Corp., 9851-9951 Sepulveda Blvd., Los Angeles 45, Calif., maintenance parts used on compressors, various, $250,662.

Union Electric & Mfg. Co., 1057 Summit Ave., Jersey City 7, N. J., signal generators, 374 ea., $259,821.

Cox & Stevens Electronic Sales Div., 845 Colony Rd., Wallingford, Conn., scales, 21 ea., $47,040.

International Latex Corp., Playtex Park, Dover, Del., coveralls, various, $94,541.

John Addison Footwear, Inc., 84 Chestnut St., Marlboro, Mass., shoes: leather flight deck non-slip, (IFB-383-1029-55), 265 pr., $60,770.

Bendix Products Div., Bendix Aviation Corp., South Bend, Ind., brake, wheel assys. and maintenance parts, various, $41,237.

Lear-Romec Div., Lear, Inc., Elyria, Ohio, pumps, 229 ea., $50,004.

Jowil Electronics, Inc., Belfield Ave. & Wister Sts., Philadelphia 44, Pa., test set, 88 ea., $133,425.

Scintilla Div., Bendix Aviation Corp., Sherman Ave., Sidney, N. Y., maintenance parts, $79,062.

Bendix Products Div., Bendix Aviation Corp., 401 Bendix Dr. South Bend, Ind., maintenance parts, $76,997.

Grumman Aircraft Engineering Corp., Bethpage, Long Island, N. Y., strut, duct and radome assys., $45,281.

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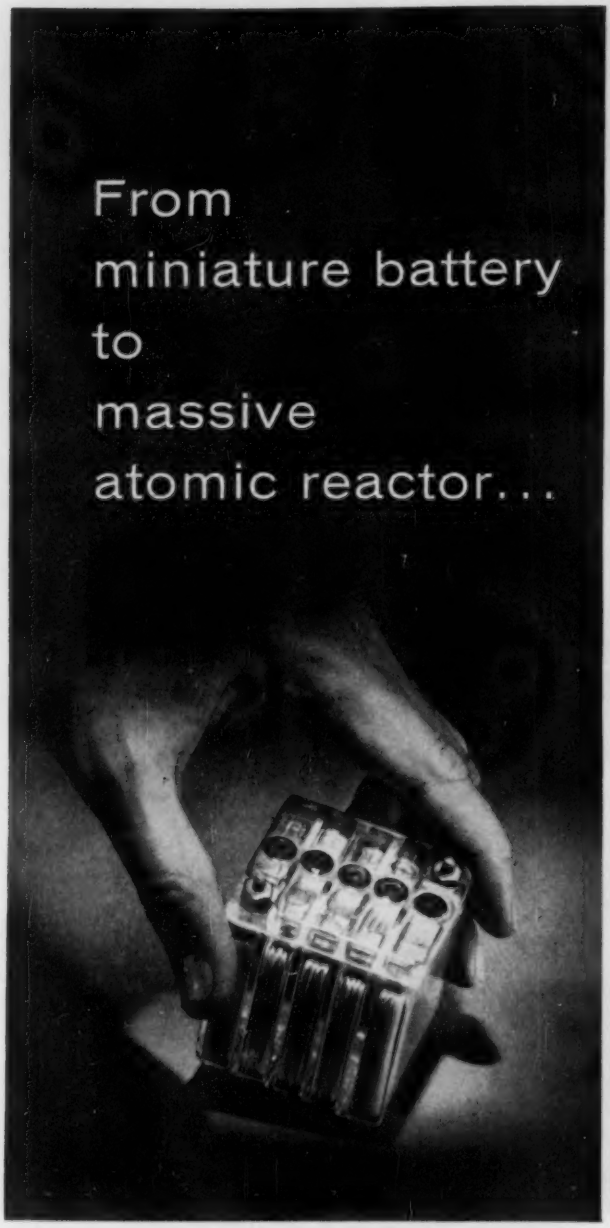

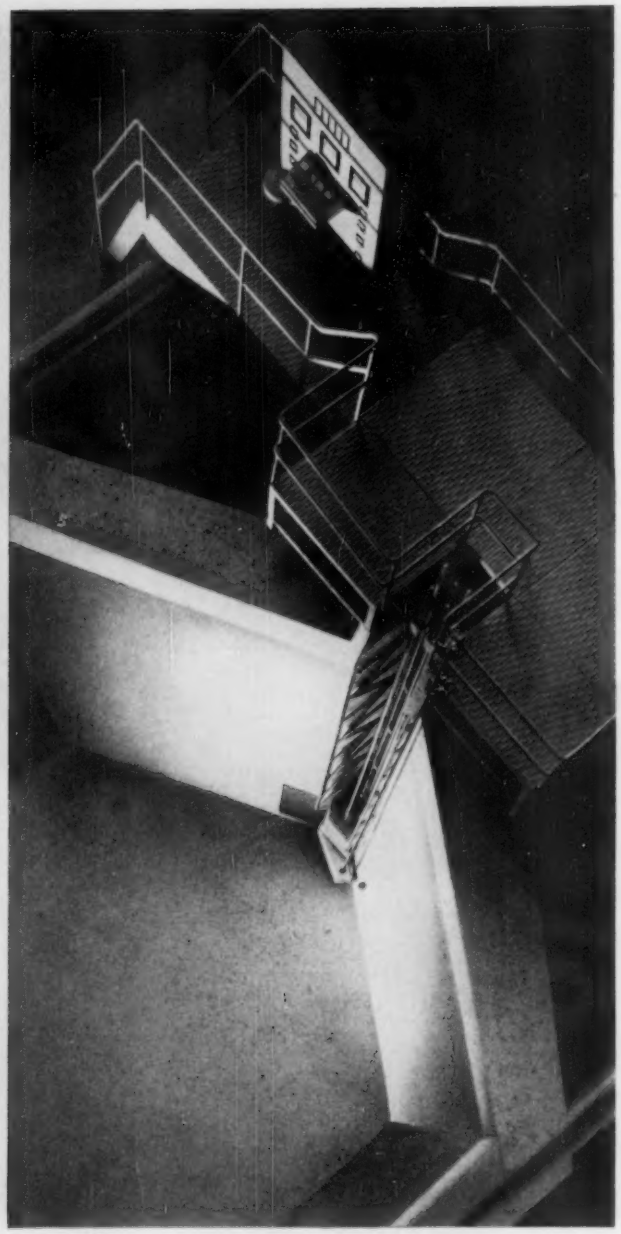

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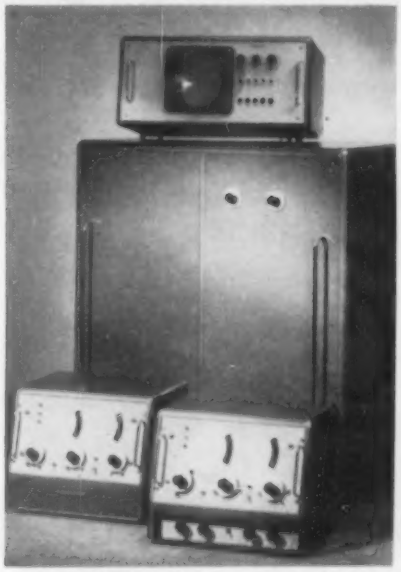
"AIRCRAFT" unit of aerial war simulator. Up to 24 units may be used during games.



SIMULATOR computer and two "planes."

British Radar Simulator Produces Aerial 'Warfare' on Command

By Philip J. Klass

Realistic aerial war games, with the blips of as many as 24 combat planes speeding across radar screens, can now be waged almost at the touch of a button and without the use of a single aircraft.

The device which makes all this possible—effectively cutting costs in the training of pilots, tactical commanders and ground radar operators—is a newly-developed British radar simulator produced by the Solartron Electronic Group, Ltd. The blips the simulator produces can be divided between attacking and defending forces at any set ratio and made to take on the flight characteristics of any desired aircraft.

Combat Realism

To provide maximum combat realism, the flight path of each attacking and defending "aircraft" can be controlled individually from separate control panels through dials manipulated by human pilots and GCI operators.

Prior to the outbreak of this electronic warfare, the control panel for each aircraft has set into it the flight characteristics of the particular type aircraft it is to simulate—maximum speed, rate-of-climb, dive and turn. In some cases, the maximum turn rate will be determined by the number of Gs the pilot can stand rather than by airplane capability.

Once these values have been established, the attacking or defending pilot can maneuver his plane only within these limitations.

The size of an aircraft normally determines the strength of radar echo received from it. The trainer also permits the size of the simulated radar echo to be pre-set to correspond with the type of plane—fighter, medium bomber or heavy bomber.

Electronic Countermeasures Too

During synthetic warfare, enemy bombers are able to employ simulated electronic countermeasures at the discretion of the pilot operator. Two types of such countermeasures are available, both used during World War II. They are:

- **"Window,"** simulating the dropping of thousands of strips of metal foil which show up as a large target on the GCI radar scope and effectively obscure the attacking bomber. When the simulated "window" is "ejected" from the plane, its radar echo, like the real thing, will diffuse and drift with the wind, slowly sink and finally disappear.
- **Noise jammer,** which can be made to perform as if it were carried in the enemy bomber or as if it were ejected on a parachute. In the latter case, it will appear on the radar scope as though it is drifting with the wind, like "window."

The choice of operating mode is left to the individual pilot's discretion.

Solartron reports that it is developing a more sophisticated type of simulated jammer which will give multiple or delayed echo returns. Another development under way will enable GCI operators to simulate ground-based electronic countermeasure equipment capable of jamming airborne radar of the attacking bombers. This unit will have both adjustable power and direction of radiation.

Three-Dimensional Combat

Solartron has carried realism to the point of designing its equipment to permit attacking and friendly forces to operate in three dimensions. The ground GCI operator has two radar scopes which display target azimuth, height and range (simulating a surveillance radar and V-beam height-finder radar). The trainer permits the GCI operator to vary the scanning rate of his simulated ground radars, employ sector scanning or achieve displaced-center display, according to Solartron.

Operators representing the attacking forces can use identical displays, or more realistically, employ the equivalent of airborne surveillance or intercept radar displays.

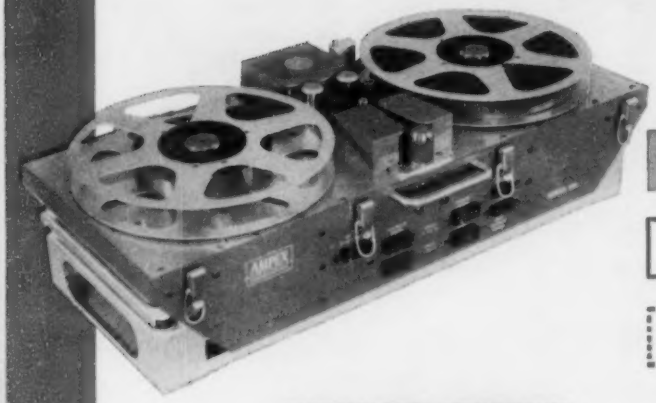
A multiple-echo attachment is available which simulates aircraft flying in such tight formations that individual aircraft echos can not be resolved.

The Solartron tactical radar simulator appears to be an extension of radar simulators developed in the United States for air traffic control studies although the British device is considerably more sophisticated and complex.

NEW HIGH ALTITUDE MAGNETIC RECORDER

THE AIRBORNE AMPEX 800 records the broadest combination of data ever obtained concurrently on one magnetic tape —performs under all high altitude environmental conditions— and furnishes data compatible with the most widely used playback equipment.

HANDLES ANY AIRBORNE DATA REQUIREMENT

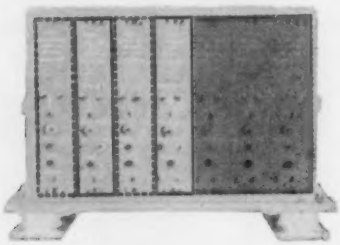


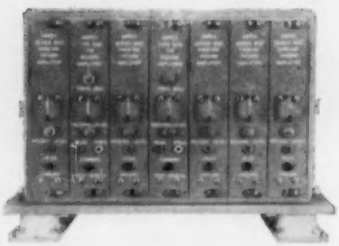
The Ampex 800 can provide from 1 to 28 data channels. By interchangeable amplifier units, each one can be adapted to any one of three basic magnetic recording techniques:

Direct recording — 300 to 35,000-cycle response for a wide-band data or multiple recording of RDB subcarriers.

FM-carrier type recording — D.C. to 5000 cycles and high instantaneous accuracy suitable for shock and vibration data.

Pulse-width modulation recording — Up to 30 instrument readings commutated on to each tape track; frequency response 0 to 5 cycles/sec.





Combinations of these recording techniques can be provided to satisfy practically any flight test requirement by simple insertion of the proper plug-in amplifiers. Separate channels can be assigned to measurements requiring wide-band response or high transient accuracy. By using pulse-width techniques, many relatively steady instrument readings can be commutated on to a single channel. All will have a common time base.

WITHSTANDS THE RIGORS OF HIGH ALTITUDE FLIGHT

The Ampex 800 will perform within specifications under vibrational forces as high as 10G — operates over a temperature range from —65° F. to +130° F. — is unaffected by altitudes to 50,000 feet — and withstands a relative humidity of 100% up to 122° F. The Ampex 800 is light in weight. It operates on 27.5 volts D.C. and 115 volt, 400 cycle, A.C. All operating functions can be remotely controlled.

RETAINS WIDELY ESTABLISHED RECORDER STANDARDS

The majority of all magnetic recorders now in instrumentation use are Ampex machines. Their recording characteristics, tape speeds, track widths and other parameters have become a standard in aircraft and missile testing. The Ampex 800 retains these standards while greatly extending the environmental and mechanical conditions under which accurate test data can be gathered.

Performance specifications, descriptions and explanations have necessarily been limited by the space on this page. A full description and detailed specifications on the Ampex 800 are available by writing Dept. UU-2243

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Blind-Flight Instruments A Must If Army Copters to Fulfill Mission

Danbury, Conn.—New blind-flight instruments suited to military helicopter operations must be found if U.S. Army Aviation is to fulfill its mission of 24-hour all-weather support to the field forces, an Army officer responsible for studying the problem said here last week.

Investigation of the state of helicopter blind-flight instrumentation has been initiated by Brig. Gen. Carl I. Hutton, commander of the Army Aviation Center, Camp Rucker, Ala., and Col. Jules E. Gonseth, head of the Army Aviation School there. Maj. Hugh Gaddis, director of the Department of Rotary Wing Training, Army Aviation Center, and a veteran of some 750 medical copter missions in the Korean war, is heading the evaluation.

Gaddis told AVIATION WEEK that lack of proper copter instrumentation seriously affected the capability of rotary wing units operating in Korea.

The Army plans to inaugurate under-the-hood instrument helicopter training at Camp Rucker next spring, Maj. Gaddis said. Pilots in the field, as well as regular students, will be sent through the training program, Camp Rucker is now processing instructors in the blind-flight course in preparation for the program.

Team Study

The center also proposes to set up a pattern of navigational and radio aids as part of the student training program. The equipment would incorporate low-frequency radio range—VOR, ILS, GCA and ADF non-directional homer.

An Army Aviation team is working with other U.S. military services, the National Advisory Committee for Aeronautics, the aviation industry and helicopter airlines on the instrument evaluation. Several Army personnel are at Wright-Patterson AFB testing new equipment.

After the study is completed, Army Aviation will request that the Continental Army, in charge of all field forces training, purchase and install the recommended instrumentation. Particularly critical at the moment is a suitable helicopter attitude instrument, Maj. Gaddis said.

Nafli Demonstration

Doman Helicopters, Inc. here, working in cooperation with Lear, Inc., has fitted a Canadian-built LZ-5 copter with a new Nafli turn, bank and dive indicator for demonstration to Maj. Gaddis.

The helicopter manufacturer is working independently on its own evaluation of a suitable rotary-wing blind-flight panel, using available off-the-shelf equipment. This program is directed by Ward Davis, Doman customer relations chief.

The three-in-one Nafli, as hooked up to the LZ-5, depicts the attitude of either rotor tip path plane or of the cabin. The pilot can get either readily by flicking a switch. The system's directional gyro, vertical gyro, transistor amplifier, power supply and junction box have been fitted into the LZ-5's roof.

An autosyn, actuated by a mechanical connection to the hub, is sensitive to the pitch of the rotor tip path plane. Another autosyn is sensitive to the roll of the rotor tip path plane. These differential autosyns correct the signal coming from the gyros to indicate the rotor tip path plane pictorially on the instrument face.

The Canadian pilot who has flown the Nafli in the LZ-5 told AVIATION WEEK that this is the first time he has seen a copter attitude instrument that provides immediate presentation of information with no need to evaluate the equipment's indication.

Also installed is a vertical speed indicator that is stated to sense as little as 100-fpm. change in rate of altitude immediately. The equipment is made by Specialties, Inc., Syosset, N. Y., which has worked with Doman on the LZ-5 installation.

Doman also plans to demonstrate these instruments to Canadian officials at Ottawa in the next few weeks.

Long-Lived Midget

The midget battery above, employing new electrode materials and construction methods, reportedly delivers near-constant voltage for two years. The new "micro-cell," developed by Elgin National Watch Co., delivers 1.15 volts (compared to 1.37 for other miniature cells) but output can be stepped up to 1.37 by using another cathode material, Elgin says. The device, which could find use in tiny portable transistorized equipment, does not leak, swell or gas, Elgin says.

CAA Airways Program Expands 1956 Services

A revised program for operation of the federal airways during fiscal year 1956 has been announced by Civil Aeronautics Administrator Fred B. Lee. Changes were made necessary following congressional revision of the agency's operating budget, which specifically precluded the discontinuance of any CAA services.

Lee noted that the new airways program provides for the continuance of all major facilities presently in operation. In addition, he said, it provides for the commissioning of 22 very high frequency omnidirectional radio ranges (VOR), assuming the cost of three airport traffic control towers and three airport surveillance radar (ASR). Increased funds in the amount of $600,000 are also available for additional personnel to handle the expanding volume of traffic.

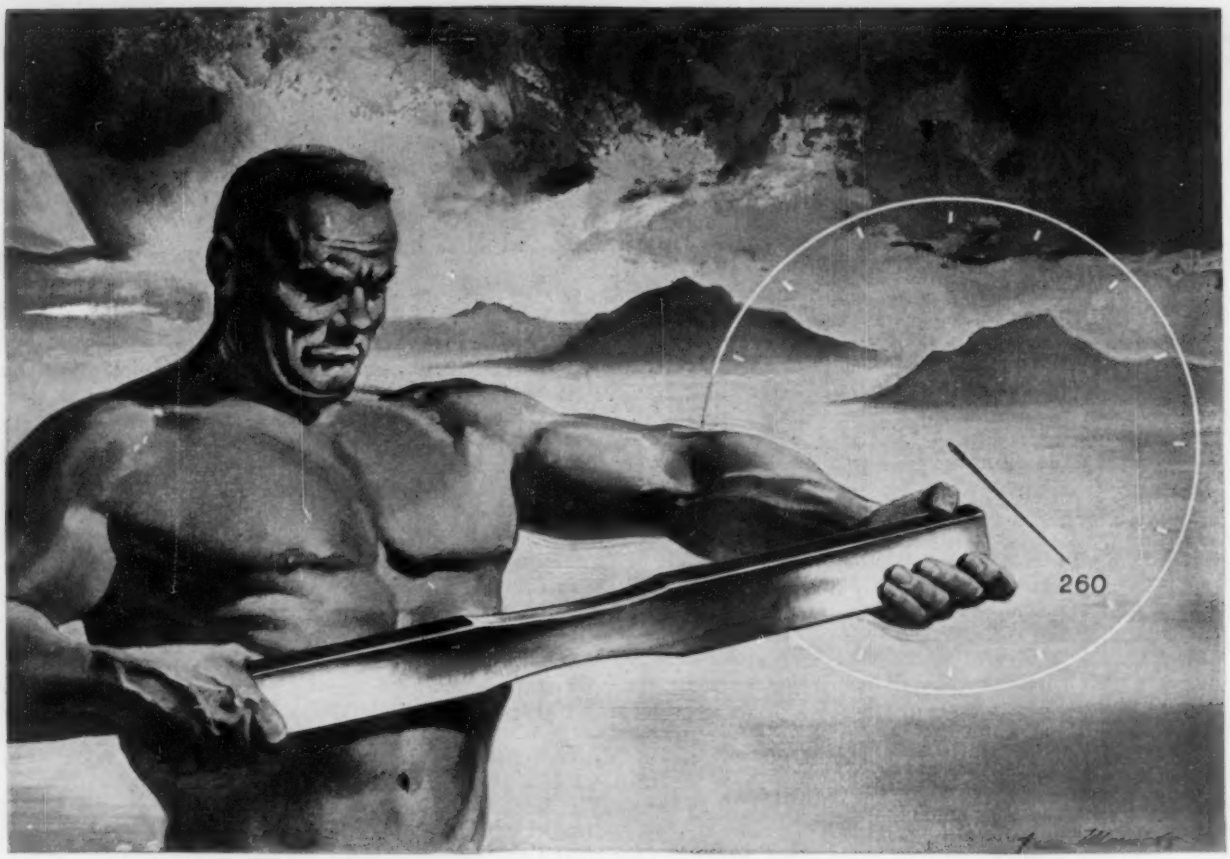
The additions to the federal airways system, limited by the funds available for their operation, include the following:

Twenty-two new VOR stations at Adamsville, Tex.; Benton Harbor, Mich.; Cherry Creek, Colo.; Gainesville, Fla.; Glenview, Ill.; Harrellsville, N. C.; Huntington, W. Va.; Los Abos, Calif.; Oceanside, Calif.; Peoria, Ill.; Perry, Ohio; Point Mugu, Calif.; Pottstown, Pa.; Salem, N. J.; San Diego, Calif.; Sayre, Okla.; Stillwater, N. J.; Stroudsburg, Pa.; Walla Walla, Wash.; Webb, Tex.; Westminister, Md., and White Cloud, Mich.

The airport towers over which CAA will assume the cost of operation are Hutchinson, Kan., Moline, Ill., and Casper, Wyo. The three ASR installations will be at O'Hare Airport Chicago, Ill.; Denver, Colo., and Burbank, Calif.

R-W Eyes Expansion

Ramo-Wooldridge Corp. is looking for small companies it might acquire to expand its already rapid rate of growth but has not found any serious prospects to date. An R-W spokesman says the company is looking for firms whose systems activities dovetail with its own in the avionics, computers and automation fields but is not particularly interested in component manufacturers.



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with a heat treatment developed by Cleveland Pneumatic

NOW YOU CAN DESIGN highly stressed steel parts that will weigh less than you ever thought possible...

At Cleveland Pneumatic, we have developed ways to give steel parts far greater strength and durability than have ever been considered possible... tensile strengths of 260,000 psi in alloys that only a few years ago were limited to 180,000 psi. Years of intensive research in our plant have developed the necessary precise controls... in designing, heat treating, machining and plating and in the important intermediate processing.

Right now, this combination of Cleveland Pneumatic's heat treatment and machining is doing almost unbelievable things for the strength-to-weight ratios of highly stressed steel parts in aircraft. Weights are being reduced without reducing strength... or strength can be increased without "beefing-up" the size and weight of parts.

Wouldn't you like to have your designers and engineers talk with us about using Cleveland Pneumatic high-heat-treat-and machining methods in *your* assemblies? Write to:

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Tool Company CLEVELAND 5, OHIO
Department C-955

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Picket Blimps Get GE High-Power Radar

The most powerful airborne search radar units yet developed are going into the Navy's new Goodyear ZPG-2W aircraft early warning picket blimps, according to General Electric.

Supplied by GE's Military Electronic Equipment Dept., these AN/APS-20E units have approximately the same power as heavy, land-based search radars. The same type is used in Navy's WV-2 and USAF's RC-121 Super Constellation picket planes. Printed wiring is used extensively in the radar to reduce weight.

Airborne radar units can detect low-flying planes at as much as twice the distance as ground or ship radars, GE says.

FILTER CENTER

►**New JAN Tube Shield**—A new version of International Electronic Research Corp.'s miniature tube shield for lowering bulb temperature can be substituted directly for JAN-type shields in existing avionic equipment without requiring equipment modification. Original model (AW Dec. 14, 1953, p. 62) needed a special base, thus limiting shield to use in new equipments under development. Preliminary tests by sponsor, United Air Lines, indicate that the new IERC shield lowers bulb temperature by nearly 40%, UAL may substitute it for existing JAN-type shields throughout its fleet. IERC's address: 177 West Magnolia, Barbank, Calif.

►**Transistor Sealing Problems**—Tests by a major West Coast avionics firm indicate that transistor manufacturers have not yet successfully solved the problem of hermetically sealing transistors to keep out moisture, which shortens transistor life. Test results reportedly have spurred several semi-conductor manufacturers to seek improved sealing techniques.

►**Flat Tube Details**—A detailed explanation of the operation of the Willys-Aiken flat cathode ray tube (AW Jan. 17, p. 17) will be made during Wescon (Aug. 24-26). William R. Aiken, the flat tube's inventor, will present one paper; R. Madey will deliver another describing beam focusing and deflection principles.

►**Where Engineers Come From**—In the course of recent interviews with officials of three West Coast avionics firms active in the digital computer field, AVIATION WEEK asked whether they were having trouble finding good computer engineers. The official for Company "A" reported he had gotten a number from Company "B"—"because several of their programs have folded up." The official for Company "B" reported picking up a number of engineers from Company "C," for the same reason, while the official for Company "C" reported a windfall of engineering talent obtained from Company "A"—because their former employer had "lost several important programs."

►**Salary Spiral**—Salaries being offered by Ramo-Wooldridge and Lockheed's Missile division, to build up their scientific staffs, are causing some alarm among West Coast avionics firms. One complaint comes from an official of a major avionics producer which itself was subject to such criticism not so long ago.

►**Coming Soon**—A new diffused-junction silicon rectifier, rated 200 amp. at temperatures up to 80C, will be in production soon at National Semi-Conductor Products, a subsidiary of Hoffman Electronics Corp. First units available will be rated for 60-v. operation, with production of 175-v. and 350-v. units following shortly afterward. Company's address: 930 Pitner Ave., Evanston, Ill.

Aero Supply Mgt. Co. Inc. of Corry, Pa., announces a series of general engineering data bulletins of a non-advertising nature prepared by Aero Supply's Research and Development Center recently established in Cleveland, Ohio. The bulletins consist mainly of technical data with charts, graphs and other valuable information related to the design of aircraft, rocket and missile fuel systems.

The first Bulletin shows viscosity vs. temperature data for approximately 120 different fluids and has been prepared for availability on or about September 6, 1955. Subsequent bulletins will appear at approximately one month intervals.

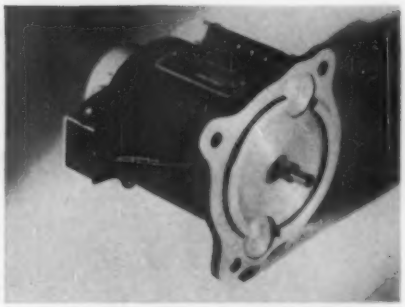
For over 39 years Aero Supply Mfg. Co. Inc. has been a leading designer and manufacturer of fuel system components, cockpit controls and related articles for all flight applications. Qualified representatives and engineers are readily available upon request to offer assistance on specific engineering and application problems.

Address Request to

Aero Supply Mfg. Co. Inc.,

Research and Development Center,

P. O. Box 402, Corry, Pa.



American Electric Model 313

COMBINATION DRIVE MOTOR AND BLOWER BUILT TO USAF SPECIFICATION 32590

This rugged, totally enclosed miniature combination drive motor and blower develops ⅛ hp at 7200 rpm, continuous duty. It operates on 3 phase, 400 cycle current at 200 volts. Teflon insulated for ambient temperature range from −65° C to 112° C. Weighs only 4.2 oz. Approx. overall length 5". Flange dia. 3½".

Many Other Models Fully Developed

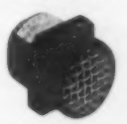
American Electric Miniatures are available for operation on 60, 400, 1600, or 2000 c.p.s. or on variable frequencies from 320 to 1200 c.p.s.

TWO TYPES:

INDUCTION — Output torque range from ½ in. oz. to 120 in. oz.

SYNCHRONOUS (Hysteresis or Reluctance Models) Output torque range from .01 in. oz. to 16 in. oz.

Ask for quotations on special requirements!



MODEL 1820A AXIAL FAN MOTOR — Totally enclosed, panel mount, screened intake, high temp. operation 20 CFM N.A.F.M. at free air. O.D. 1.45", 115 V., single phase, 400 cycle, or variable frequency models.

MODEL 430 AIRCRAFT DRIVE MOTOR — 1/12 h.p. 11,000 r.p.m. Teflon insulation. −65° F. to +160° F. Completely qualified to MIL 7969 specs.

MODEL 323 ELEVON ACTUATOR — Develops ½ h.p. at 11,200 rpm. 200 V. line-to-line, 3 phase, 4 wire, 400 cycles. Teflon insulated for −65°F. to +160°F. operation. Meets MIL M 7969 specifications.

MODEL 2010 HYSTERESIS SYNCHRONOUS MOTOR — For Reference Timing Applications 12,000 r.p.m., 5 to 25 gm. cm. torque. Plain or geared shaft extensions.

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Federal's "Advance-Engineered" Aircraft Cables...

MODERN AVIATION is advancing with tremendous strides. When specifying cable *today*, aircraft designers *must* plan for *tomorrow's* performance demands!

To this urgent need for "Advance-Engineered" cables, Federal's vast development and production resources have been effectively geared.

Whatever the application . . transmission lines, interconnecting cables, antennas, audio lines, navigation systems . . . Federal cables keep you in step with new and unexpected requirements . . by utilizing the latest improvements in dielectric materials, manufacturing techniques and quality control.

Federal's constant testing assures peak efficiency of physical and electrical properties under the most rugged conditions of commercial and military applications.

Whatever your requirements for "Flight-Leader" dependability, Federal has the cable type you need . . . or can help you design it. Why not get in touch with Federal today about your aircraft cable problems?

Call NUtley 2-3600 or write Dept. D-7110.

Federal's Aircraft Cables and Principal Applications:

RG-8/U, RG-8A/U – 50-ohm general purpose coaxial cables for use as interconnecting cable and transmission line with airborne radio.

RG-9A/U, RG-9B/U – 50-ohm coaxial cables for use with airborne radio at UHF and higher frequencies.

RG-17/U, 18/U, 19/U, 20/U – 50-ohm coaxial cables used with ground equipment as low-loss antenna and transmission lines.

RG-11/U, 59/U – 73- and 75-ohm coaxial cables used chiefly in ground equipment such as ILS and GCA as transmission lines and interconnecting cables.

RG-55/U, 58/U, 58A/U – 53.5 ohms; RG-62/U, 71/U – 93 ohms; Federal's K-38, KT-107 – 72 ohms: coaxial cables with a wide range of aircraft applications, including audio lines for interphone.

Federal's K-1201 – Static Precipitation Aircraft Antenna, accepted by the major aircraft manufacturers.

RG-87A/U, 141/U – 50 ohms; RG-140/U – 73 ohms: solid-core "Teflon" coaxial cables for higher-temperature applications.

Federal's K-256, 257 and 258 (50, 70 and 93 ohms): miniature coaxial cables with "Teflon" dielectric . . . meeting the rigid requirements of the aircraft industry where smaller and lighter coaxial cables are required.

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LETTERS

Fixed-Base Plea

On what basis does the Civil Aeronautics Board allow a subsidy-supported airline to enter into competition with unsubsidized small, private, fixed-base operators?

Capital and National Airlines are now in the business of leasing aircraft to corporations and of running their executive operations for them, furnishing crews, maintenance, financing and other associated services.

Pan American, Piedmont, Eastern, and other airlines now install equipment, overhaul engines, instruments and radio, sell fuel, perform maintenance, inspection, engineering, modifications, conversions or other services for business-operated aircraft, although there is little economic or practical similarity between airline and executive operations.

'Paperwork Pressure'

Many fixed business operators receive their entire, unsubsidized livelihood from furnishing these services to this new segment of aviation that they built themselves. Now that it appears profitable, the airlines, with the comfortable backing of their subsidies, are moving to cash in on a market whose development they once opposed. Similarly, the nonskeds displayed enough imagination to initiate coach, tourist and other much needed public services in the face of airline opposition only to have the airlines take it over (when it showed profit) under cover of heavy CAB paperwork pressure.

We ourselves held a Letter of Registration as a Large Irregular Air Carrier for several years and used it solely to furnish standby aircraft for companies whose own planes were down for maintenance, or auxiliary aircraft for customers whose planes were too small for some particular purpose. We voluntarily withdrew it because our use of it did not justify the required amount of time, paperwork and quibbling over commas, methods of printing tariffs, whether reports or tariffs could or could not legally arrive at the CAB on a legal holiday, etc., ad infinitum.

We have a voluminous file of correspondence with the CAB which makes pretty hilarious reading, now that it's in retrospect and since we don't make our living at it.

Also, our Letter wasn't worth the establishment of an entire department for the sole function of following the hyperlegalistic maneuverings and oppositions of airlines with whom we did not compete by any stretch of imagination. If we used our Letter, we competed with the airlines and opposed us. If we didn't use it enough, there was no "necessity in the public interest," and they opposed us anyway.

We had no interest in the creation of a whole new profession of airline-CAB liaison interpreters, lawyers and consultants and preferred to turn our energies and investment to the development of private business aviation, trusting that the airlines could be satisfied with their subsidies, guarantees of economic welfare and CAB protection from

Aviation Week welcomes the opinion of its readers on the issues raised in the magazine's editorial columns. Address letters to the Editor, Aviation Week, 330 W. 42 St., New York 36, N. Y. Try to keep letters under 500 words and give a genuine identification. We will not print anonymous letters, but names of writers will be withheld on request.

"nonskeds," "irregulars," "low cost flights," "tourist fares," "coaches," other naughty words, new airlines or other competition.

As a result, we can take pride in the fact that we have added over 100 executive DC-3s to the American business aircraft fleet.

Airline Raid!

However, it seems that business aviation has now grown big enough, thanks to the efforts of fixed-base operators, to attract brokers, opportunists and the airlines, since, like the aircoach, somebody else has furnished the idea, initiative, investment and the trouble to pioneer.

This will be an excellent chance for the CAB to demonstrate whether it is interested more in development of aviation, as originally intended in its founding, or in development of airline "economic security," as it has acted.

Will it now impartially protect the "economic welfare" of the rest of aviation against the competition of airlines as assiduously as it has protected the welfare of the airlines against the rest of aviation?

W. F. Remmert
President
Remmert-Werner, Inc.
Lambert Field
St. Louis 21, Mo.

Anti Alcohol

In the July 4 issue of Aviation Week you printed my letter "Airplanes and Alcohol." The reaction was fast and furious. I started getting letters from airline pilots and others connected with the aviation industry. So far everyone agrees 100%—airplanes and alcohol don't mix.

See what some of them have to say: "You hit the nail on the head. I know you could have said more against this terrible situation (alcohol served on planes) which is ridiculous and can and will cause trouble.

"I have had personal experience with 'big shot' drunks already aboard airplanes or attempting to board airplanes and they can be stinkers in both smell and action."

Another letter states: "Just recently I had occasion to write to Northwest Orient about a poor souse to whom the steward served no less than 12 'bourbon and waters' (beginning in N.Y.C.) until the guy had to be carried off the plane at Detroit." He must have been a charming traveling companion and a lot of fun for the steward. Did the other passengers get any attention on this trip?

Probably the most serious incidents brought to my attention are those contained

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Opportunity for the holder of a production-item patent!

A large manufacturing plant equipped with precision machinery will finance and manufacture, on royalty basis, patented production items.
If you have such a patent, and are interested, write:

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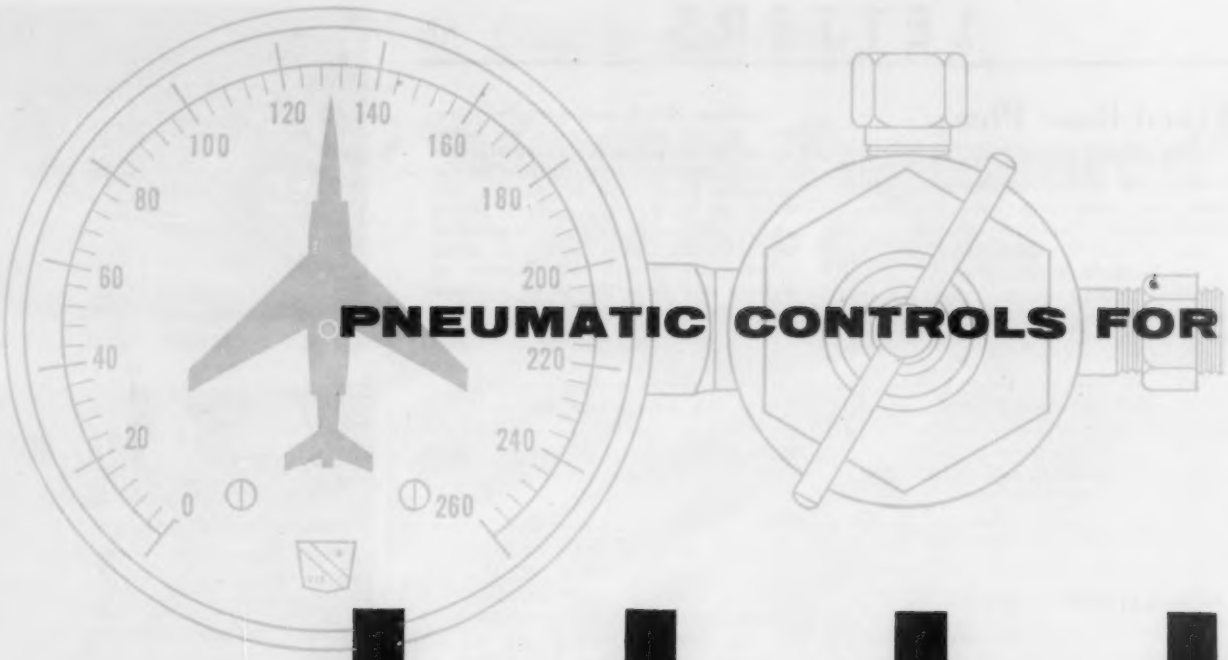
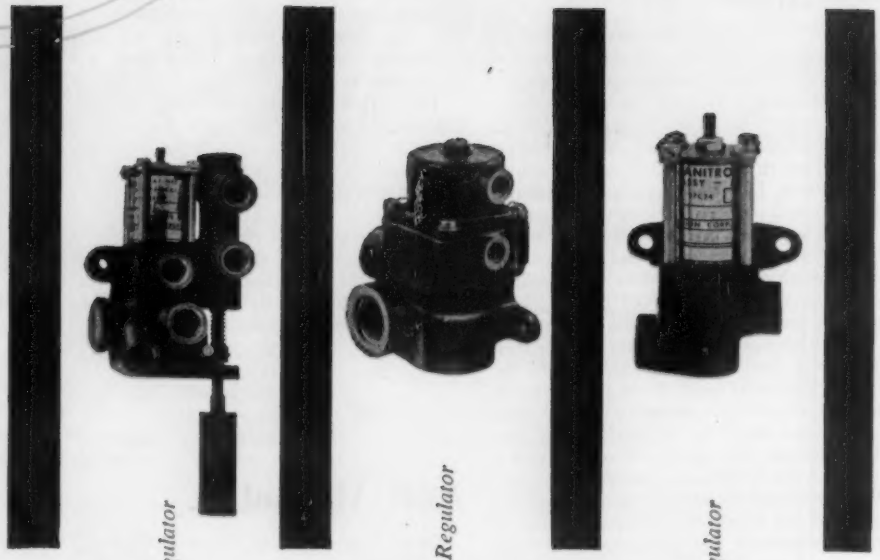


PNEUMATIC CONTROLS FOR



1. *Canopy Seal Regulator*

2. *Pylon Tank Regulator*

3. *General Purpose Regulator*

JET AIRCRAFT

Take air, bled off a jet compressor at extreme conditions of 260 psi and 740°F, reduce to required pressures and deliver it to a canopy seal, a fuel tank, a pneumatic mechanism or an anti-icing system . . .

Solutions to assignments like these call for air pressure controls built with the finest of engineering skills. Janitrol has developed just such skills backed by extensive production facilities in becoming a recognized leader in "harnessing" aircraft combustion and associated equipment. During 50 years of experience in combustion engineering, Janitrol has charted many new regions in related engineering fields including air pressure controls for aircraft.

Here are five, for example, which Janitrol has developed for individual manufacturers of military aircraft:

1—A canopy seal regulator which is mechanically actuated by canopy movement. An auxiliary port is also provided for other uses.

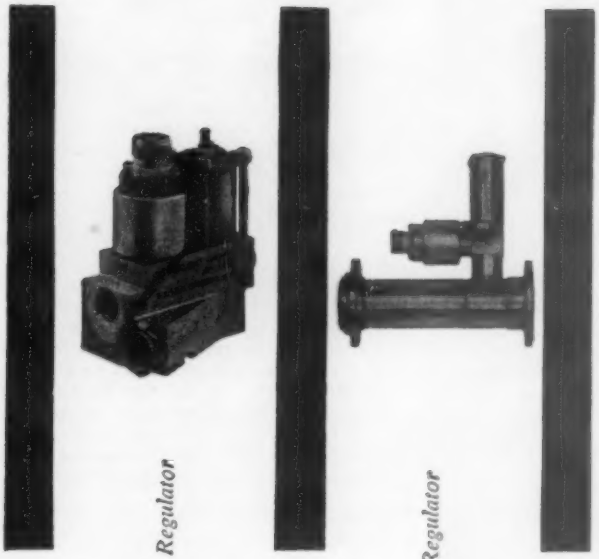
2—Pylon tank regulator with relief valve—maintains constant pressures for fuel transfer.

3—General purpose regulator for canopy seal or is applicable to other uses. Operates with separate solenoid valve for shut-off.

4—Canopy seal regulator with built-in solenoid and relief valve.

5—High pressure regulator used in connection with thermal anti-icing systems where high air flows are required.

We invite you to consult your nearest Janitrol district engineering representative concerning *your* air control problems.



4. Canopy Seal Regulator

5. High Pressure Regulator

50 years experience in combustion engineering

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in a letter written by an airline pilot (12 years as a captain) who said in part: " . . . I had two cases last fall when I had to order an obviously intoxicated passenger from the cockpit at night during final approach! . . . I heard of an incident on one of the airlines two years ago when an intoxicated passenger came forward, gained access to the cockpit and took a hefty swing at the captain."

These true experiences hardly need comment. They are summed up by a pilot on one of the major airlines who wrote: ". . . Drastic steps should be taken to change this picture."

Civil Air Regulations state: "A pilot shall not permit any person to be carried in the aircraft who is obviously under the influence of intoxicating liquor or drugs, etc." Unless the law has been repealed all pilots who permit liquor to be served are breaking the law. Ironically enough, it seems to be the pilots who are against serving liquor but the airlines put them on the spot. How do the airlines get away with it?

I have seen correspondence between an airline passenger and the chairman of the Civil Aeronautics Administration in which this same question was asked. The reply from the CAA was a masterpiece of evasion.

If it's legal why don't they say so? If it's illegal why don't they do something about it?

My only connection with the aviation industry is that of a passenger. However, as an ex-Navy pilot and one who still gets a good deal of pleasure out of private flying, I feel that I have a slight understanding of some of the problems a flight crew is up against under normal conditions. A drunk passenger doesn't help these problems one bit.

As a passenger I feel much more comfortable and relaxed when some loud mouth isn't charging up and down the aisle.

It would be interesting to hear what some of the airlines and the CAA have to say on the subject. So far they haven't been heard from. Something bothering them?

Daniel B. Scully
1535 Sheridan Road
Highland Park, Ill.

Technical Help Needed

The Air Force Armament Center at Eglin Air Force Base, Florida, is at present continuing a rapid rate of expansion. The need for qualified technicians in the various fields listed below is one vital to the interests of the country.

Your magazine is known to reach readers who can fill the vacancies here at the Armament Center. Inasmuch as we are prohibited by regulation from placing paid advertising in order to inform those who would be interested in these opportunities, we hope that your magazine will publish this information so that these men may realize the need for their services.

Our openings lie mainly for those qualified for Civil Service grades between and including GS-9 through GS-14. The technicians most urgently needed are physicists, mechanical engineers, mathematicians, aeronautical engineers, ballisticians, and especi-

Versatile WESTERN GEAR Hoist

selected for new Bell anti-submarine helicopter!

When Bell Aircraft Corporation developed its new HSL-1 helicopter for Navy anti-submarine detection and rescue work, it selected Western Gear to design and manufacture the airborne hoist aboard the unique twin rotor aircraft. This Western Gear hoist lifts 800 lbs. at 50′ per minute. The hoist shown in inset above, weighing 28 lbs. and similar in design to that selected by Bell, can lift 400 lbs. at 100′ per minute, spooling more than 100′ of 3/16″ cable. By modifying the gear train it can lift up to 1600 lbs. at 25′ per minute. A level wind assures accurate spooling and the motor is equipped with radio noise filter to comply with AN specifications.

Western Gear's more than 40 years of experience supplying important components for aircraft of practically every description was a major factor in its selection by Bell to design and manufacture this vital hoist for airborne use. Knowledge obtained since 1888 enables Western Gear to provide a speedy, economical solution to any problem involving the mechanical transmission of motion or torque. Why not avail yourself of this experience to solve your problem? Western Gear engineers will be glad to offer their help and recommendations from your blueprints or specifications. Address General Offices, Western Gear, P.O. Box 182, Lynwood, California.

"The difference is reliability" ★ Since 1888

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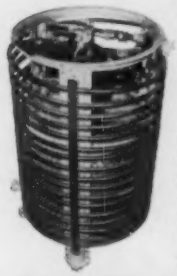

YESTERDAY

Pioneered by Bendix, the first liquid oxygen converters delivered to the Government more than met then existing requirements. In 1945 they were marvels of efficiency. In fact, one of these units is still operational today.

TODAY

Continued *Pioneering* and development have enabled us to offer the most efficient, most complete line of liquid oxygen equipment and systems in the world. Converter systems from the 2.5- to 25-liter capacity provide for the physiological requirements of modern high-altitude flight.

TOMORROW Bendix *Pioneering* continues with the anticipation of more stringent requirements of higher altitudes and speeds. We stand prepared with research and development to meet these requirements.

The Best in LIQUID OXYGEN CONVERTERS from Bendix

Whether you're interested in components or complete systems, specify *Bendix*. For full details, write PIONEER-CENTRAL DIVISION, BENDIX AVIATION CORPORATION, DAVENPORT, IOWA.

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● LETTERS

ally electronics engineers. Applicants chosen in these grades may expect to receive between $5,440 and $10,320 annually.

Any readers interested in applying for jobs at the Armament Center should submit a Standard Form 57, Application for Federal Employment, available at any first class post office, to the Civilian Personnel Office, 3201st Air Base Wing, Eglin Air Force Base, Florida, for any information they may desire.

Needs for various technicians will continue at the Armament Center during the foreseeable future. Therefore, if any reader should doubt his qualifications he is urged to contact the above office as to the current needs.

Your assistance in solving this vital problem will be most sincerely appreciated.

HARRY R. BEAMER
Colonel, USAF
Air Force Armament Center
Air Research and Development Command
Eglin Air Force Base, Florida

More on Slopeline

The continued discussion over the relative merits of the centerline and slopeline approach light systems seems to be bogged down for lack of adequate criteria.

One criterion which ought to be applied to any guidance system of this nature is the requirement that fragmentary parts of the system's presentation must still yield useful bits of positive information.

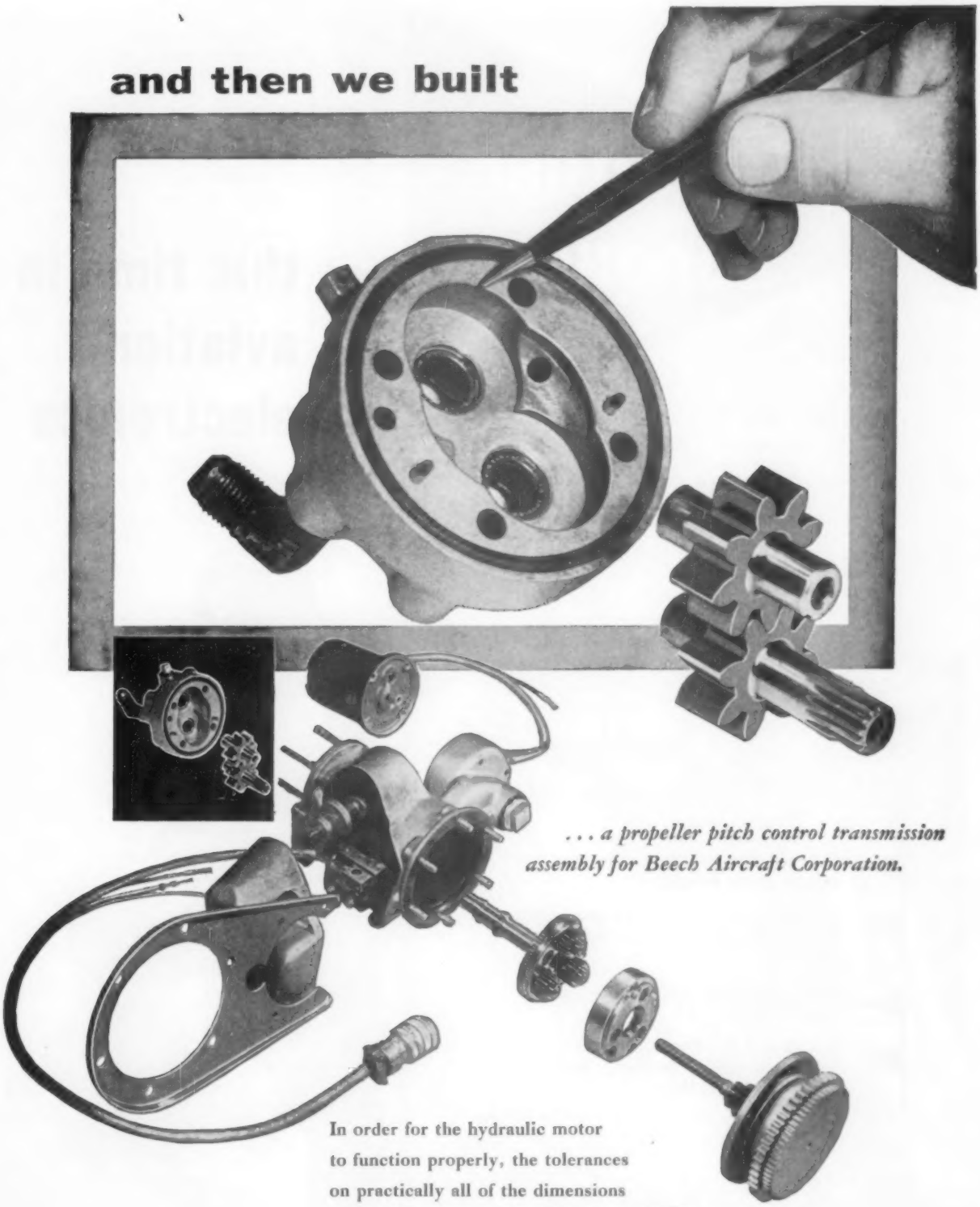
Many ingenious guidance systems are logical and easily understood when viewed in their entirety. However, when conditions are such that only small parts of the overall presentation can be seen, these systems frequently become unworkable. In the case of some systems, when only fragmentary parts are visible, these portions tend to be misleading, resulting in a wrong response. It is therefore essential that if parts of the system's presentation are to be useful at all, the information they furnish must be of a positive character.

The worst conditions under which a guidance system is still fully effective could be considered the minimum conditions for the system. (In practice a safety factor would be added.) However, flight conditions often fluctuate so widely and so rapidly that it is not possible to stay consistently above fixed minimums. A system which fails completely, or even worse, gives misleading information whenever conditions go below the minimum for the system, is not a safe system.

Paradoxically, it is often the more simple systems which best stand the test of providing useful positive information in their fragmentary parts. Complex systems, because of the integration of different kinds of information into one presentation, frequently do not meet this test.

For example, in the centerline system, even a single light visible will furnish some information regarding track, provided the heading is known. If only two consecutive lights are visible, some information regarding both track and course is provided. In the case of the slopeline system, a single

and then we built



. . . a propeller pitch control transmission assembly for Beech Aircraft Corporation.

In order for the hydraulic motor to function properly, the tolerances on practically all of the dimensions had to be held to within .0001" or .0002" for squareness, parallelism and concentricity.

INDIANA GEAR

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another conquest...

... this time in aviation electronics

YOU TOO will be right ON TOP

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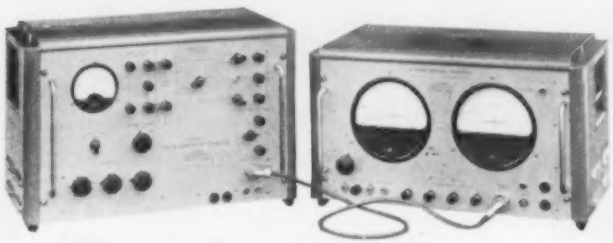

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fixture visible provides no useful information and even several consecutive fixtures do not always provide a bit of useful, positive information.

Another criterion which ought to be applied to a guidance system is the requirement that a system's presentation be fully compatible with normal visual information received simultaneously, and that information should be presented in the same manner as the same information is received under normal conditions.

The tendency to combine several functions into one presentation is not necessarily the most efficient or safest solution. The resulting multi-function presentation is often so unlike the normal appearance of the problem that special training is required to interpret it effectively. This has been discussed in detail by others.

There is another aspect of the "unnatural" presentation which deserves serious thought. This is the fact that an "unnatural" presentation is basically incompatible with normal visual information. When using such a system one must rely on it entirely and little use can be made of any bits of normal visual information which are still getting through. (And more is still getting through than is generally realized.) By inhibiting the use of normal visual information, the valuable corrobrating effect of duplicating information is lost, as well as any additional intelligence it might furnish. Further, it makes the eventual transition from the "unnatural" presentation to the actual situation an abrupt one. This is the reason for the difficulty in "going visual" after an instrument let-down.

Ideally, a guidance system would merely amplify essential bits of normal visual information without distortion. Practically, this can best be achieved by an uncomplicated (though possibly extensive) presentation which allows a pilot to make his usual evaluations of the situation in a manner as normal as possible.

ROBERT W. BREILING
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I was somewhat amused at your photograph of a plastic mount used for holding metallurgical specimens, Aviation Week May 16, 1955, page 66. The note implied something new had been added for the Metallography Laboratory. I am sure it will be of interest to you to know that such plastic mounts and the mounting procedures described have been used in "up-to-date" laboratories for at least fifteen years.

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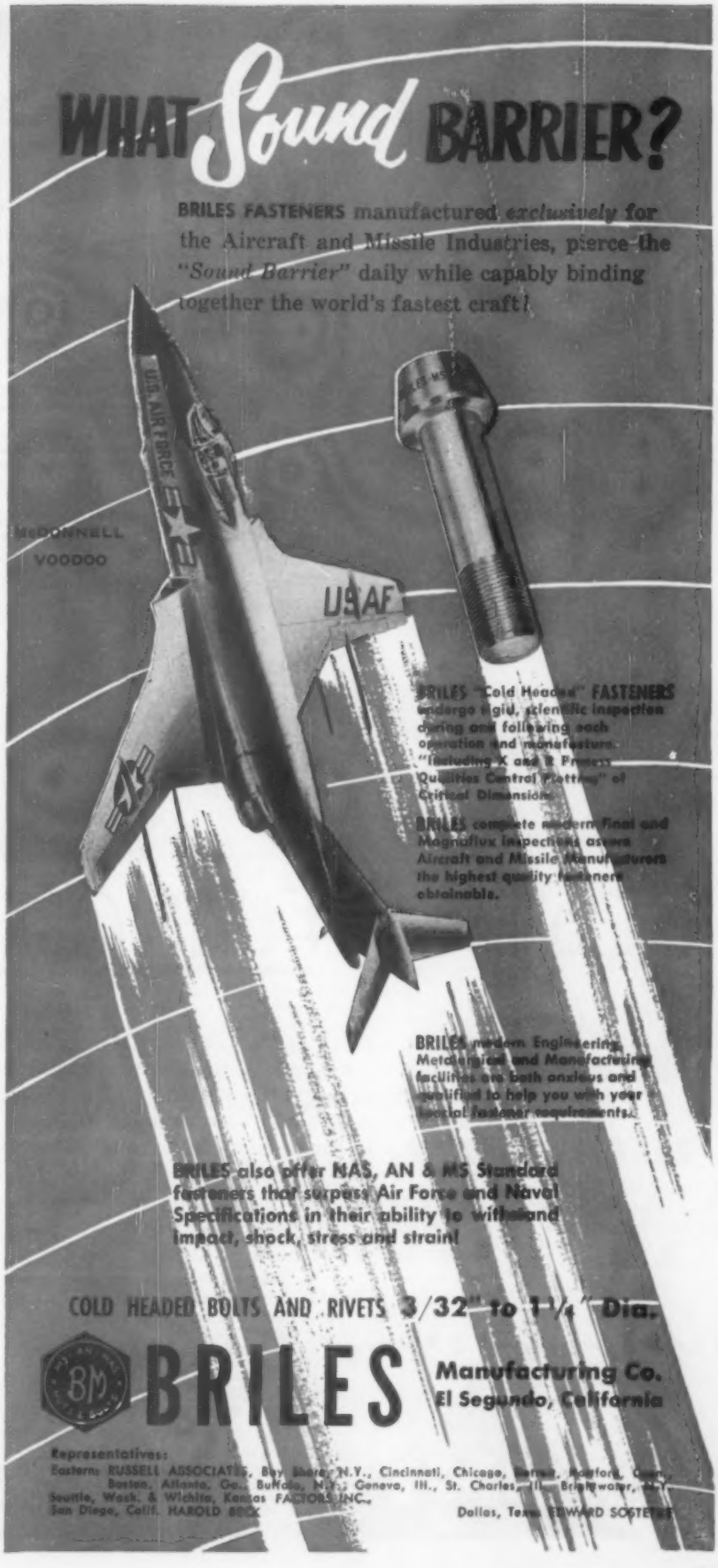
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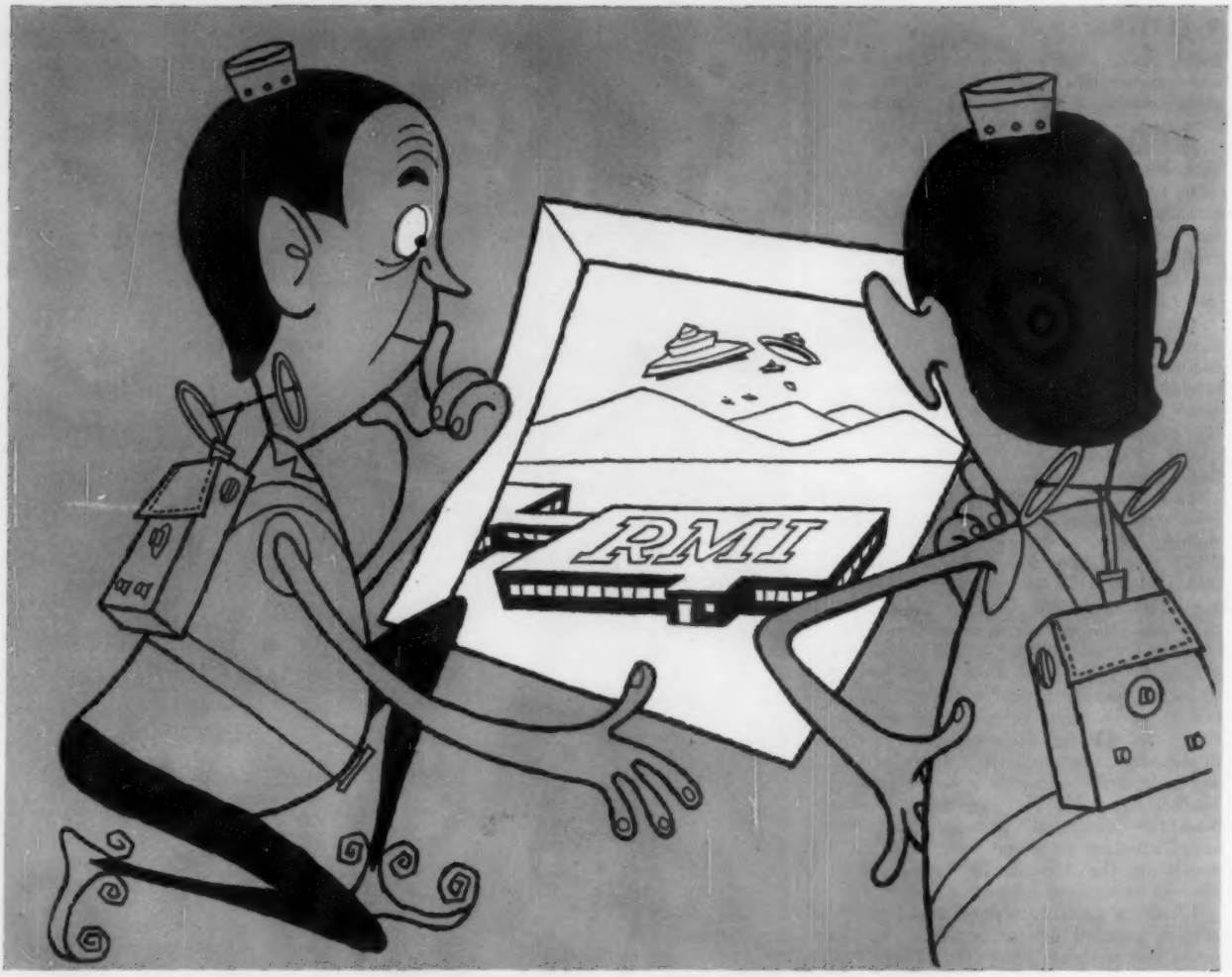

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AVIATION SAFETY

CAB Report on Executive PV-1 Crash

Pilot Off Course, Hits Mountain

THE ACCIDENT

At approximately 1740,[1] Nov. 20, 1954, a Lockheed PV-1 aircraft, owned and operated by the Plymouth Oil Co., Inc., Pittsburgh, Pa., crashed on Calf Pasture Mountain, near Waynesboro, Va. All five occupants, including the two crew members, were killed. The aircraft was demolished by impact and fire.

HISTORY OF THE FLIGHT

N 1505V departed Sinton, Tex., at 0845, Nov. 20, 1954, on a VFR (Visual Flight Rules) non-stop flight to Baltimore, Md., with Pilot Arthur Milton Soper, Co-pilot Joseph R. Kolodzie, and three passengers, all company executives. No flight plan was filed with CAA.

Prior to departure, the pilot telephoned the forecaster at the nearest U. S. Weather Bureau Station, Corpus Christi, Tex., and was briefed on en route weather conditions. He was advised that the weather should remain suitable for VFR flight as far as Atlanta but beyond that point ceilings would probably lower. Pilot Soper said that if these conditions existed when he was near Atlanta he would land and refuel.

A routine flight was made to Atlanta and the aircraft landed at 1313. The aircraft was on the ground approximately 2 hours and 25 minutes because ARTC (Air Route Traffic Control) could not clear the flight sooner due to traffic delays in the Washington area. During this period the pilot was briefed on en route weather and the aircraft was refueled with 208 gallons of 100 octane fuel.

The aircraft departed Atlanta at 1535 for Baltimore on an IFR (Instrument Flight Rules) clearance. The clearance specified a cruising altitude of 11,000 feet over airways Green 6 and Red 77 to Lynchburg, Va., Red 37 to Gordonsville, Va. and Red 33 and Red 17 to Baltimore. At 1628, when in the vicinity of Spartanburg, S. C., the flight requested a change in altitude to at least 10,000 feet on top of clouds because icing conditions were being encountered. This necessitated a climb of approximately 5,000 feet which was immediately approved by ARTC.

At 1708, Greensboro, N. C., radio received the following position report: "N 1505V on instrument flight rules, 6 minutes northeast of Greensboro range at 08 on top at 16,000 feet, request lower altitude, estimating Lynchburg at 22." Accordingly the aircraft was cleared to descend to and maintain 11,000 feet.

At 1724 Lynchburg radio received a position report from N 1505V, "Over Lynchburg at 1722, at 11,000 feet, estimating Gordonsville at 38." The Lynchburg altimeter setting, 29.50, was given the flight and the flight's position report was relayed to Washington ARTC.

A few minutes later the following clearance was relayed to the flight, "ARTC clears N 1505V to cross Remington at 11,000, cross Arcola range station at 10,000, maintain 10,000."

The 1628 Baltimore and Washington weather was then given as: Baltimore, scattered clouds 1,000 feet, estimated ceiling 7,000 feet, overcast; visibility 3 miles; light rain and haze; temperature 61; dewpoint 61. Washington, ceiling measured 8,500 feet, overcast; visibility 10 miles; light rain; temperature 60; dewpoint 57; wind east-northeast 16; pressure falling rapidly. The flight acknowledged this message at 1727 and canceled its IFR flight plan. This was the last radio contact with the aircraft. Approximately 13 minutes later it crashed on the mountainside and burned.

INVESTIGATION

The accident occurred in a downward-sloping open field adjacent to the Skyline Drive and 6 miles north of its junction with U. S. Highway 250. Heading of the aircraft at first impact was 91 degrees magnetic and the altitude above sea level was approximately 2,100 feet.

The right wing struck a fence post while the aircraft was making a shallow right turn; the impact severed the wing tip. The aircraft then struck the ground with terrific force 75 feet beyond the post. In sequence the right wing struck the ground followed by the right propeller and engine, the nose of the aircraft, and the left propeller and engine. The aircraft then bounced into the air and shed parts along a path for 1,300 feet at which point the main portion of the wreckage came to rest and burned. Parts of the aircraft were found 1,940 feet from the point of first ground impact.

Examination of the airframe disclosed no evidence of structural failure prior to impact.

Impact forces tore both engines from the aircraft and they were found among the most forward components along the wreckage path. The propellers were also found at widely separated points. Engines and propellers were badly damaged. No evidence of failure or malfunctioning of the engines prior to impact was found. It was determined that at the time of impact both propellers were operating within the cruise range. Both propellers were equipped with deicer fluid distributors.

The radio equipment of the aircraft consisted of ADF, VOR, and VHF. This equipment sustained extensive damage in the ground impact and fire with the result that little information of value could be learned from an examination of the individual units. The most recent check of the radio equipment was on Oct. 27, 1954,

[1]All times herein are eastern standard and based on the 24-hour clock.

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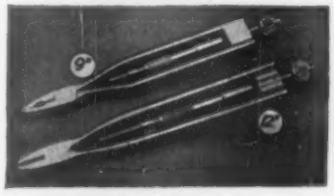

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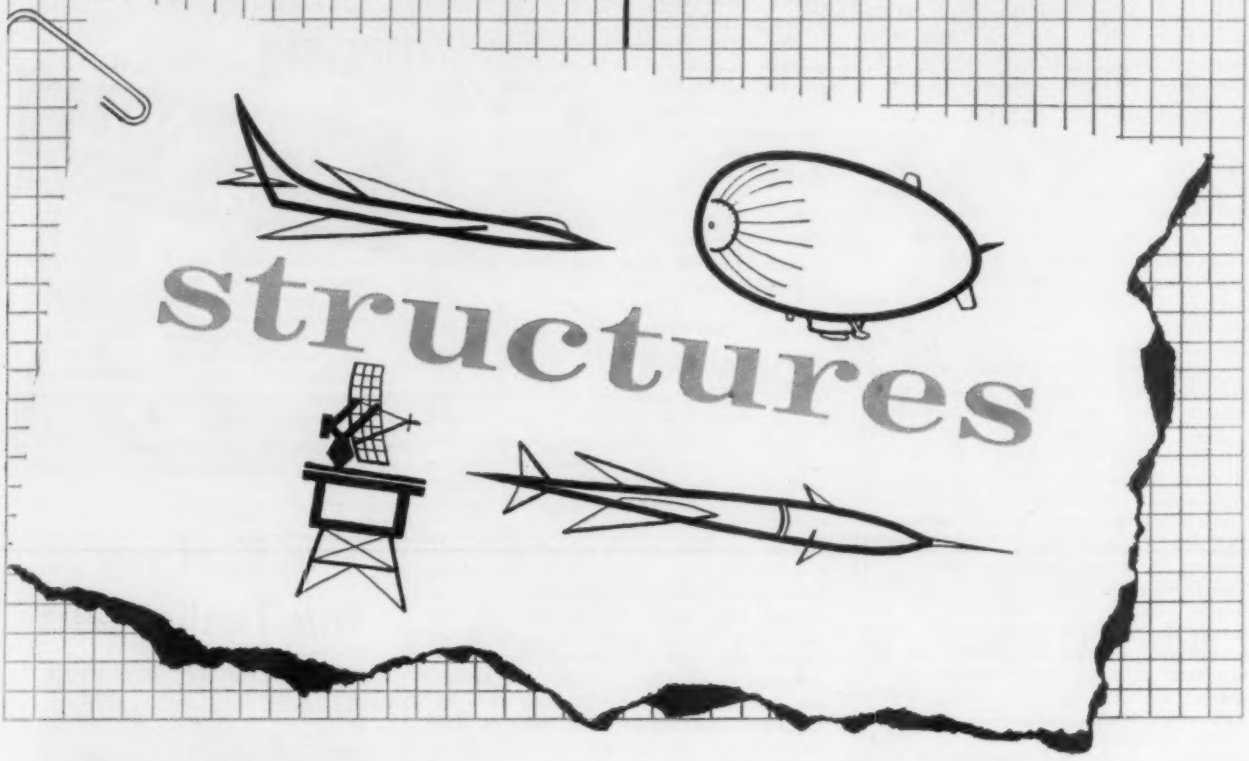

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at which time operation was satisfactory. All radio contacts were normal throughout the flight and there was no indication of any radio equipment malfunctioning. The aircraft received no service during the Atlanta stop other than refueling.

Investigation indicated that the aircraft descended from 11,000 feet at Lynchburg to the northwest of Red 37 airway. This airway's course from Lynchburg to Gordonsville is 54 degrees and is over lower terrain that was free of fog at the time of the accident. The aircraft was first seen flying a north-northeast heading at about 2,500 feet m. s. l. in the Blue Ridge Mountain area, 16 miles south of the accident site. The mountain tops were covered with fog and there was a layer of fog over the valley to the west. Eyewitnesses near Skyline Drive testified that they saw the aircraft flying at a very low altitude just below this fog layer.

A floodlighted marble edifice (a tourist attraction known as Swannanoa) is located ¼ mile south of the junction of the Skyline Drive and U. S. 250, on top of a mountain 2,400 feet above sea level. A caretaker standing outside this building saw the aircraft heading northeast nearly hit one of the building's 60-foot high towers as it passed over. It was apparently flying with power reduced.

N 1505V, its flashing lights on, then circled to the left and passed over Swannanoa again in a northerly direction. This time it just missed an 85-foot high statue situated on the building grounds. The caretaker, formerly an Air Force mechanic, said both engines were developing power as the aircraft turned left toward the Shenandoah Valley.

A witness in the valley northeast of Waynesboro had several glimpses of landing lights in breaks in the fog about 600 feet (2,000 m. s. l.) above the ground. In the general area there were fog covered peaks ranging in altitude from 2,500 to 4,000 feet m. s. l.

Another witness, 2½ miles southwest of the accident scene, heard the aircraft at what seemed a very low altitude heading northeast toward the ridge with its engines sounding normal.

On Nov. 20, 1954, a cold front extended southward from Lake Ontario to the South Carolina Coast. One of several frontal waves was located in North Carolina and moved northward along the front into southern Virginia during the afternoon. This wave had a direct influence on the weather encountered by the flight from Atlanta and at the time of the accident it had moved into central Virginia with accompanying thunderstorm activity and moderate showers.

Terminal forecasts used by the pilot at Atlanta indicated 2,500-foot ceilings and 7 miles visibility at the time the flight would be due to arrive in the Washington-Baltimore area. Ceilings 7,000 to 9,000 feet maintained in that area during the period. West of Red 77 and 37 airways the tops of the mountains were obscured by clouds, showers, and fog. On the morning of November 20 Pilot Soper told the U. S. Weather Bureau meteorologist at Corpus Christi, Tex., while receiving weather in-

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OFTEN

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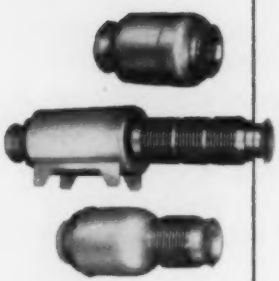

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formation by phone, that he intended to descend before reaching Washington and proceed VFR to his destination.

Pilot Soper was employed as a pilot by the Plymouth Oil Co. in 1945, and until the summer of 1953 the company aircraft in use were of a lighter and smaller type than the one involved in this accident. The company purchased the PV-1 at the suggestion of Mr. Soper and its modification was completed at San Antonio, Tex., in June 1953. On July 10, 1953, at San Angelo, Tex., he obtained a rating on PV-1 aircraft and this rating was effective at the time of the accident.

ANALYSIS

The heading of Red airway 37 between Lynchburg and Gordonsville is 54 degrees magnetic. This airway passes over low rolling terrain and at the time of the accident the cloud ceilings were 6,000-7,000 feet. Although this airway was specified in the flight's clearance it is apparent that this course was not flown after passing Lynchburg but rather that the aircraft continued to fly on about the same heading which was flown between Greensboro and Lynchburg. A continuation of this heading passes over the accident site.

There is also the possibility that after passing Lynchburg the pilot used the Montebello Omnirange as a means of navigation. If this was done it might account for the aircraft being where it was when the accident occurred. The Montebello range station is 25 miles southwest of the accident scene and is nearly on a continuation of the course flown between Greensboro and Lynchburg. A 53-degree magnetic radial of the Montebello Omnirange is Victor airway 140 and it is on course between Montebello and Baltimore. This airway also passes over the scene of the accident.

The area of the Montebello Omni station, Skyline Drive, and the nearby Blue Ridge Mountains would have required instrument flight on Nov. 20 due to fog and clouds covering the mountain tops. Because of this condition the flight should have maintained an altitude of at least 5,000 feet m. s. l. for safe terrain clearance. Had the flight remained on the course north of Lynchburg, which was specified in its clearance, the ground could have probably been seen between breaks in the clouds and a descent in this direction would have resulted in the aircraft being clear of all clouds at an altitude of about 6,000 feet.

It is believed that the pilot was not certain of his exact location because he descended to a dangerously low altitude in a mountainous area. This belief is supported by the pilot's circling of the floodlighted building in a probable attempt to identify his location. Winds at the flight's altitude over Lynchburg were from 220 degrees at 30 knots and at lower altitudes in the accident area were from 320 degrees at 15-20 knots. From the wind direction given it is apparent that the flight could not have been blown off course into the accident area.

The last radio contact canceling the IFR clearance ended at 1727. From this time until the accident occurred there was 13 minutes of radio silence. It is not known

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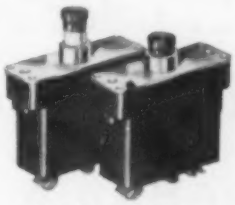

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if the aircraft radio equipment failed during this time. However, this appears unlikely since there were on board several radio receivers covering different navigational aids. This is supported by two facts:

(1) All previous radio contacts were made in a normal manner.

(2) The pilot may have become aware of his position in the last minutes of the flight since when the accident occurred the aircraft was heading directly toward the Gordonsville radio range station and the originally approved course.

Regardless of the pilot's reasons for making the various turns it is difficult to find a logical or reasonable explanation why he proceeded into instrument conditions and let down to such a low altitude over mountainous terrain.

FINDINGS

On the basis of all available evidence the Board finds that:

1. The flight crew and aircraft were currently certificated.

2. According to company records the aircraft was under its allowable gross weight and the load was distributed so that the center of gravity of the aircraft was within approved limits.

3. There was no evidence indicating power or structural failure, malfunction of controls or communication and navigation equipment prior to impact.

4. Had the flight continued on airways on an IFR flight plan at 11,000 feet to Gordonsville and then descended it would have established visual flight conditions and have been over low terrain.

5. The flight made a descent under instrument conditions to a low altitude after canceling the IFR clearance near Lynchburg.

PROBABLE CAUSE

The Board determines that the probable cause of this accident was the pilot's failure to follow his original and approved course and the letdown over mountainous terrain which resulted in the aircraft entering a cloud deck and striking the mountain during an attempt to regain a proper course.

By the Civil Aeronautics Board:

Joseph P. Adams
Josh Lee
Chan Gurney
Harmar D. Denny

(Ross Rizley, Chairman, did not participate in the adoption of this report.)

TWA Monthly Report

Trans World Airlines reported 359.9 million passenger-miles flown in the month of July, an increase of 11% over the same month in 1954. TWA flew 76.5 million passenger-miles on international air routes and 283 million passenger-miles in domestic service during July for gains of 16% and 9%, respectively, over the same period in 1954.

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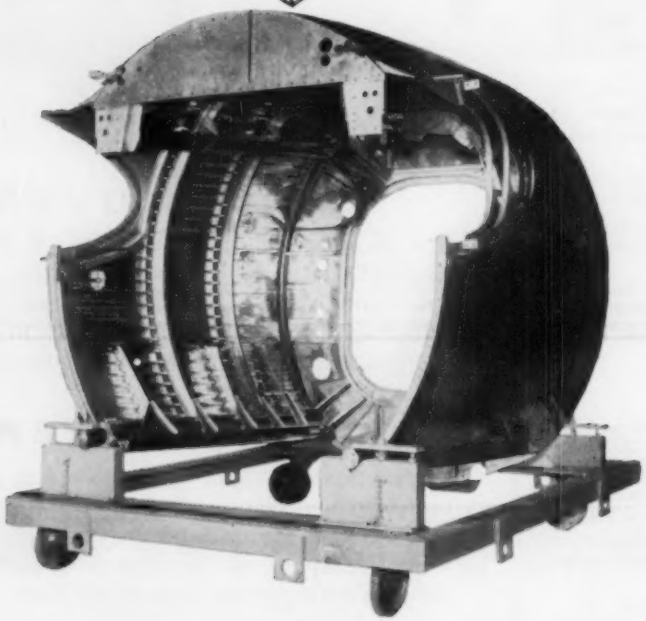

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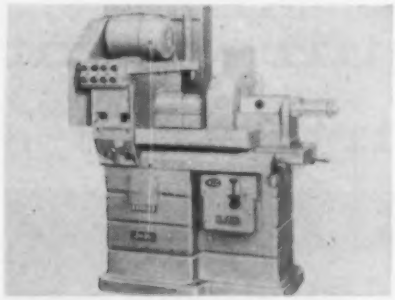

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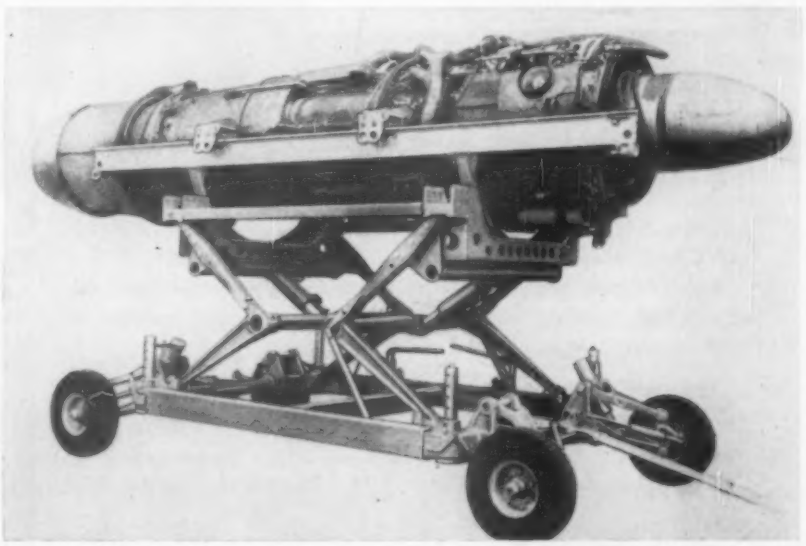
Lear-Romec Div., Lear, Inc., Elyria, Ohio.



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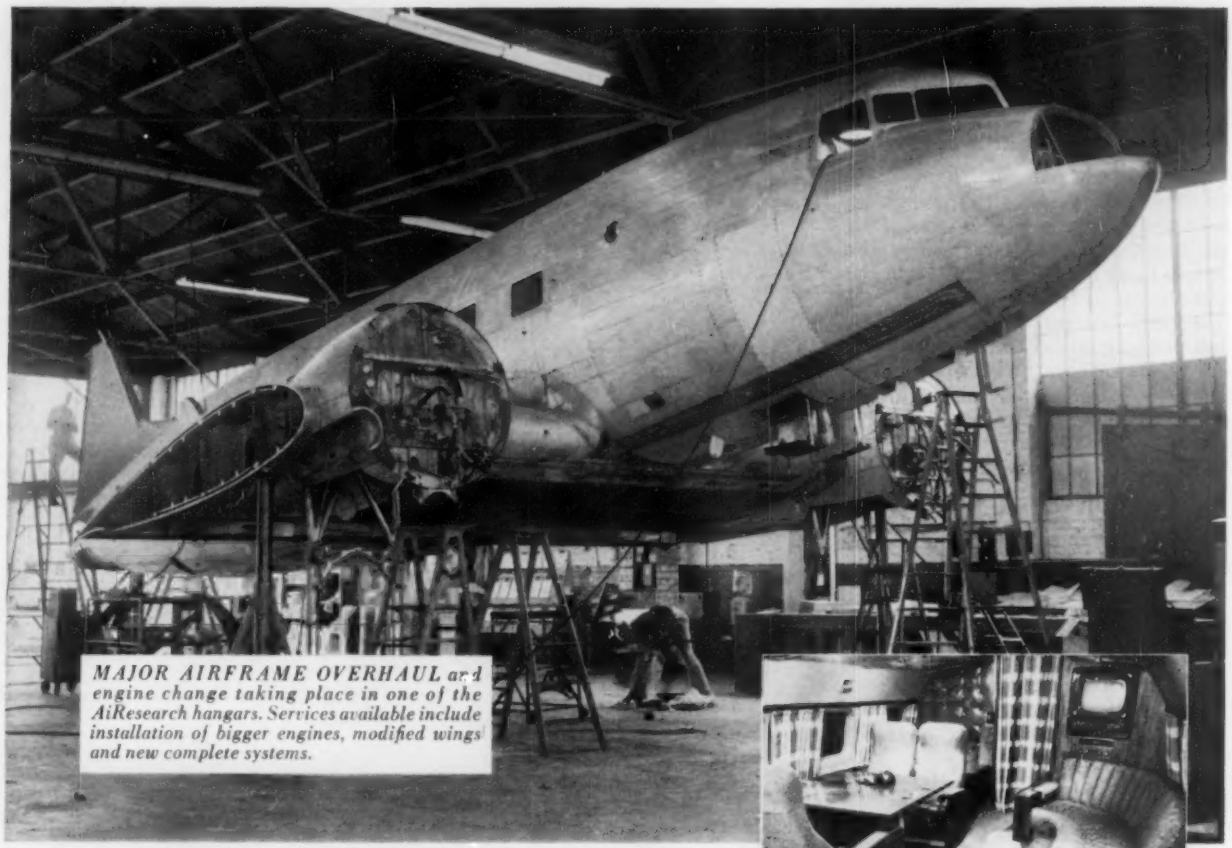

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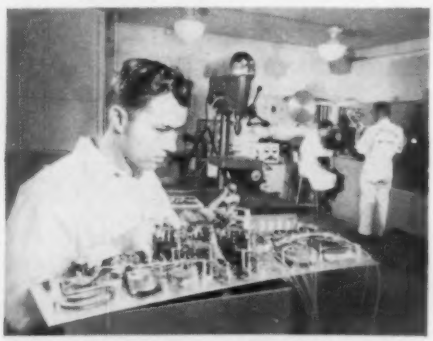

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Pick-a-shaft FKS–¼ shaft covers 13 types and includes high-voltage coupler for protection in operations up to 10K volts.–Clarostat Mfg. Co., Inc., Dover, N. H.

New Nobursink deburring and chamfering machine for openly accessible hole faces has black-oxide finish for friction reduction. Manufacturer reports that secondary burr is avoided by accomplishing shaving action with minimum pressure.–Nobur Manufacturing Co., 6860 Farmdale Ave., N. Hollywood, Calif.

Series 1100 lightweight restrictor valves for 3,000-psi. hydraulic service have internal or external threads, an ambient temperature range of −65 to +275F and weigh about 20 to 35% less than other models. Poppets and interior parts are corrosion resistant.–Aircraft Products Co., 300 Church Road, Bridgeport, Pa.

Hydraulic adjustable loading dock with 20,000-lb. capacity, Model No. 4 AF, has automatic safety device and self-leveling action for varying heights of freight carrier beds plus carrier spring deflection during freight transfer.–Rowe Methods Inc., 2534 Detroit Ave., Cleveland 13, Ohio.

Single phase EPDF dial feed rotary indexing welding machine has six welding stations and is said to be able to produce 1,000 completed assemblies per 50-minute hour.–Sciaky Bros., Inc., Department M-3, 4915 W. 67th St., Chicago, Ill.

New miniature centrifugal governor for fractional-horsepower motors is ½ in. long. Made of metal and non-hygroscopic materials for resistance to fungus and humidity.–Nader Mfg. Co., 2661 Myrtle Ave., Monrovia, Calif.

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Model 21 Mona-Matic manufacturing lathe has four-cut, fully automatic work cycle. Cam stack in programming control dictates operating sequences desired. Dual template air gage tracer offers template control for the last rough cut and final finish cut.—Monarch Machine and Tool Co., Sidney, Ohio.

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Hydraulic die handling truck Model E-12-16 has 16,000-lb. capacity and lift and push-pull members. It is available in battery, gas-electric or diesel-electric power units.—Elwell-Parker Electric Co., 4205 St. Clair Ave., Cleveland 3, Ohio.

Adjustable-bed hydraulic gap press comes in hand-air-oil or motor-operated models. Both have press frame construction for rigidity under full loads and hydraulic gages calibrated in pounds and tons pressure on the work.—K. R. Wilson, Inc., Arcade, N. Y.

Eight-day elapsed-time aircraft clocks are being installed in Douglas DC-7s. Made with either a 12- or 24-hour dial, center chronographic sweep second and hour register hands, A-10-A clocks are manufactured according to MIL-C-9196 and 10400 USAF specifications.—Wakmann Watch Co., Inc., 15 W. 47 St., New York 36, N. Y.

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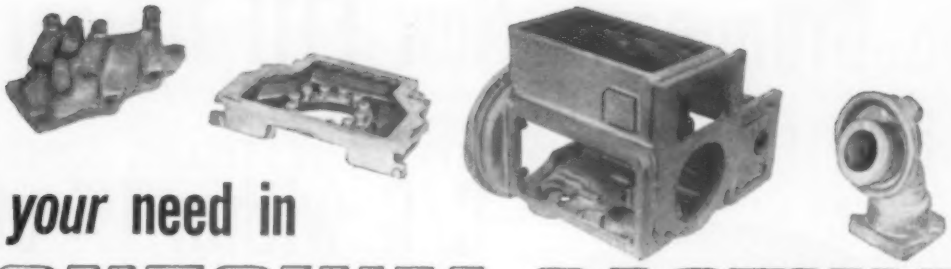

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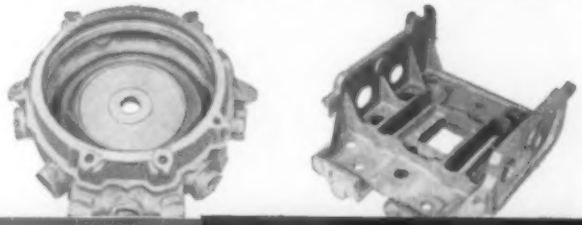

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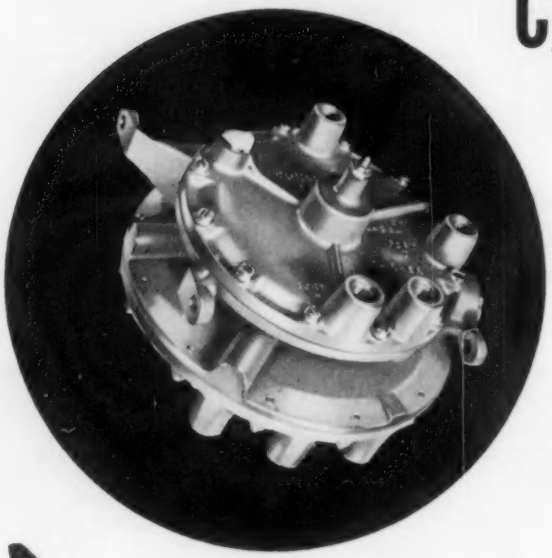

When Grumman Aircraft asked Parker to assist in the design and development of fuel system components for the F11F-1, one requirement was a simple, reliable control system to maintain aircraft longitudinal C/G within close limits through accurate, automatic sequencing of the fuel tanks, widely dispersed from the center of gravity.

To help solve this problem a Parker team of engineers and production specialists from the Fuel Division worked directly with the Grumman design group in order to achieve maximum engineering design and production coordination. As a result of this close teamwork a hydro-mechanical fuel balance system was developed that holds C/G within 1% of MAC. Information and knowledge exchanged first hand between the Grumman engineers responsible for the system design and the Parker engineers responsible for the component design was a large factor in the solution.

During operation of the system, a control unit senses absolute fuel head in forward and aft tanks and feeds these heads into opposing diaphragm chambers at opposite ends of a control valve. This valve in turn operates a shut-off valve between the tanks. Desired fuel head difference is held to ± ½ inch over the complete range of flows, temperatures, and flight attitudes up to 20° climb or dive. One of the principal features of the system is that it continuously works to maintain C/G. Any error is constantly compensated for throughout the entire range of fuel consumption.

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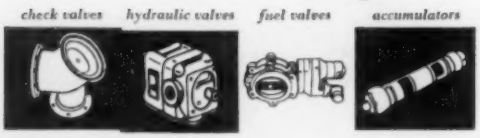

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Examiner Shuffles North-South Routes

American, Eastern, Capital, Trans World would obtain new segments to existing Northeast-Southwest service.

By Craig Lewis

Washington, D. C.—New competition on main routes between the Northeast and Southwest is recommended by Civil Aeronautics Board Examiner William J. Madden in his report in the Northeast-Southwest Service Case.

Madden has recommended route shifts that mean new competition among American Airlines, Eastern Air Lines, Capital Airlines and Trans World Airlines on routes between groups of cities in the Northeast, South and Southwest.

In his report on the case, one of the largest under CAB consideration, the examiner awards routes to carriers already operating in the areas involved.

Through Service Restriction

With the exception of the addition of Tulsa and Oklahoma City to TWA's route, all new route awards would be subject to through flight restrictions to maintain the through service purpose of the routes.

Applications of National Airlines, Delta-C&S Air Lines, Braniff Airways, United Air Lines, North American Airlines and Aero Finance Corp. were rejected by Madden.

Here are the examiner's recommendations:

- **A Houston-Nashville Segment** to connect with American's Route 4 for Houston-New York service, adding Pittsburgh as an intermediate point. San Antonio is also added to Route 4.
- **A Fort Worth Segment** to connect with Eastern's Route 5 for Fort Worth/Dallas-New York service via Memphis, Nashville and alternate routings through Pittsburgh and Philadelphia or Washington, Baltimore and Philadelphia.
- **A New York-Atlanta-New Orleans direct route** for Capital Airlines through extension of Route 55 beyond Atlanta to Birmingham, Mobile and New Orleans; and extension of Route 51 north from Washington to Baltimore, Philadelphia and New York and south from Nashville to Atlanta, Birmingham, Mobile and New Orleans.
- **Addition of Tulsa and Oklahoma City** to Trans World Airlines' transcontinental Route 2 and extension of Route 2 beyond Baltimore to Philadelphia and New York.

The complicated Northeast-Southwest Service Case is basically concerned with the need for competitive service between three groups of cities: New York, Philadelphia, Pittsburgh, Baltimore and Washington in the Northeast; Atlanta, Chattanooga, Knoxville, Memphis and Nashville as the midway cities, and Dallas, Fort Worth, Houston, New Orleans, Oklahoma City, San Antonio and Tulsa in the Southwest.

Nearly all of the route segments under consideration have one-carrier service. Many of the cities involved complained of inadequacy of service over routes without competition. Atlanta and Dallas, among others, complained that their carriers offered service on non-competitive routes inferior to that offered on Competitive routes.

Cites Lack of Service

"While the cities may have fallen short of establishing inadequacy in the technical sense," says the examiner, "they have established in general a situation where mature services under present day standards do not exist. It is useless, in the face of the present economic stature of the airline industry, to attempt an explanation for the absence of some choice of carrier on heavily traveled, long-haul segments such as New York-Atlanta, New York-Dallas, Washington-Houston and New York-New Orleans.

"Attempts at explaining this absence become especially fruitless when there is raised the point that many less dense segments have two (and some three) carriers from which to choose."

Concluding that the competition is needed, the examiner favors an exchange of American and Eastern routes to satisfy the need between the Southwest and Northeast. He feels entry of Eastern into Fort Worth/Dallas and of American into Houston, giving both carriers a route to each point from New York "presents the most forthright, efficient and adequate solution."

Diversion Threat

The report finds that the exchange of American and Eastern routes keeps the threat of diversion to a minimum and requires certification of fewer new route segments than proposals of other carriers.

The route of Delta Air Lines between the Texas cities and Atlanta is protected from diversion by routing Eastern's Fort Worth/Dallas-New York route northward via Nashville.

Addition of Tulsa and Oklahoma City to TWA's route is designed to improve service between the Oklahoma cities and the Northeast. American Airlines currently serves both points, and the addition of Pittsburgh to American's route is regarded as a service improvement.

The adjustments recommended for Capital's route serve to untangle the tortuous route pattern the carrier must contend with in serving Atlanta. The extensions of Routes 51 and 55 give Capital through routes from New York to Atlanta and New Orleans via both Pittsburgh and Washington.

In his report, Examiner Madden

Tourist Service on Polar Route

Los Angeles—The Scandinavian Airlines System will begin DC-6B tourist service over the North Pole to Europe next month.

Peter Tornqvist, SAS district manager in Los Angeles, said the cost of a round trip tourist ticket from Los Angeles to Copenhagen, Paris and London will be $756. Two weekly flights now in operation, one leaving Monday at 12:05 A.M., and a second on Wednesday at 11:55 P.M., will become mixed-service flights on October 5, the beginning of the off-season traffic period.

The combination flights will accommodate 39 tourist passengers in the forward cabin and 8 first-class passengers in the aft section. Full course dinners will be served to all.

Following inauguration of tourist service, SAS will offer a family fare plan from Nov. 1 through March 31 with savings of $300 on first-class round trip tickets and $200 on tourist tickets. Additional savings of $30 on each first-class ticket and $40 on each tourist-class ticket are available on off-season reductions.

says that asking Capital to compete with Eastern on New York-Washington-Atlanta-New Orleans service with its present route pattern amounts to "sending Capital into a contest with its right hand tied."

Pittsburgh Expansion

Madden finds a need for competition on routes between New Orleans, Birmingham and Atlanta and northeastern cities now served effectively only by Eastern, and he feels Capital should get the route rather than Delta or National. Traffic potential on the route isn't found heavy enough to support more than two carriers.

Pittsburgh benefits from a number of the recommendations. Certification of the city as a point on American and Eastern's routes to the Southwest and addition of Tulsa and Oklahoma City to TWA's route all serve to expand Pittsburgh's service to the West.

Addition of Eastern and American also gives Pittsburgh four trunk carriers to New York—Capital, Eastern, American and TWA. Adjustments in Capital's routes give Pittsburgh better service to the South as would a recommended removal of restrictions on Eastern's services to southern cities.

In extending services from the South and Southwest to New York, Madden recommends certification of TWA and Capital from Washington to New York via Baltimore and Philadelphia, a jealously guarded preserve of American and Eastern.

Reasons for Rejections

The report points out that the segments are necessary to avoid discrimination among northeastern cities in serving the South and West and don't constitute finding a need for new service between the Eastern points. TWA and Capital would operate between Washington and New York on a through-flight basis, as National does now on Miami flights, and the service would have little or no effect on Eastern and American, according to the report.

Applications of the remaining carriers were rejected largely because they called for extensive new route grants outside the territory served by the applying carriers. United Air Lines, North American and Aero Finance all proposed new services or new certificates in areas they do not currently serve.

Braniff and National serve parts of the areas under consideration, but their certification would bring them into other areas they do not operate in.

Delta's routes cover a greater part of the area involved, and CAB Bureau counsel had recommended a new route for the carrier from San Antonio to New York. But the examiner found that Delta lacks sufficient historical interest in the Northeast, a new area for the carrier, to warrant extension of its routes to New York.

Delta objects strongly to the examiner's findings.

Delta President C. E. Woolman told AVIATION WEEK that his company will use every "proper avenue open to us to convince the members of the Board that the examiner has erred and that Delta's application as originally filed is an economic must for the good of the South and the continued growth of our company."

DC-8 to Best DC-7 in Flying Cost

Direct operating costs of Douglas Aircraft Co.'s DC-8 jet transport should be lower over longer ranges than the piston-engined DC-7C, and the new airliner's structure will have features designed to reduce indirect expenses.

Chief DC-8 project engineer Ivar L. Shogran figures the direct operating cost of the 125-passenger overwater coach version at approximately 1.3 cents per 200-lb. nautical mile over a range of 1,200 to 3,750 miles. This compares with about 1.7 cents for the DC-7C over a 1,500-to-3,100-mile range. Breaking down the 200-lb. yardstick to the average 160-lb. passenger plus 40 lb. of baggage, the cost apparently is calculated in cents per available nautical seat-mile.

In his DC-8 formula, Shogran took a depreciation period of 10 years and an international fuel price of 20 cents per gallon. For the DC-7C, eight years depreciation and 26½ cents per gallon were used.

In overseas airline service, Shogran says the DC-8's direct operating expenses will be approximately 40% lower than the DC-7C on Paris-New York flights against a 60-knot headwind, 30% between London and New York and 25% on routes down to 500 nautical miles.

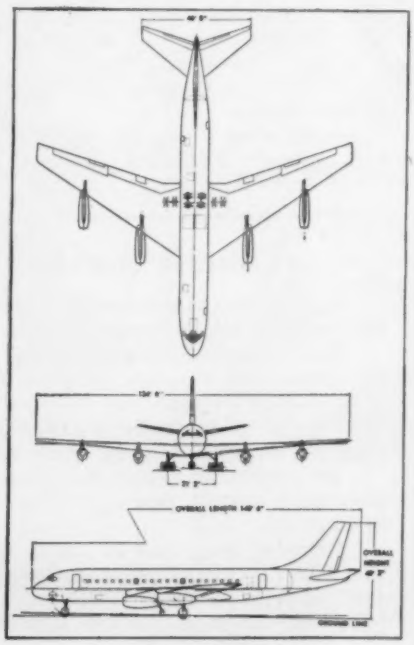
Structural features of the jet transport that will reduce indirect operating costs include:

• **Two passenger doors.** The DC-8's cabin will have forward and aft doors for rapid loading and unloading. They also will aid combination first-class and tourist service.

• **Underwing refueling.** This feature will be incorporated with equipment capable of fueling the airliner in a time span that will match other coordinated loading and unloading.

• **Cargo loading.** Devices have been designed that will load or unload all cargo and baggage in five minutes. In addition, galley servicing will be independent of passenger entrances to free congestion at the terminal gates.

• **Landing gear.** Like the DC-6, the jet transport is designed to pivot around either main gear for maximum ground maneuverability.



DOUGLAS DC-8

Two Australian Lines Show Record Earnings

Melbourne—The two government-owned-and-operated Australian airlines have completed a successful fiscal year of operations, and their annual reports, when published, are expected to show record net earnings.

Qantas Empire Airways, Australia's international airline operator, should show a net profit in excess of $650,000. The net earnings of Trans Australia Airlines will be in excess of $600,000.

Tasman Empire Airways—jointly owned by Australia and New Zealand—will show its first profit, around $80,000. It is small, but it replaces a chronic deficit.

Qantas' successful year is attributed to the introduction of Super Constellations which spurred passenger interest and airline use. Administrative improvements and changes in overseas routings also were responsible for some improvements in earnings.

Preliminary figures show that passengers on international services increased by 5.6 per cent, freight-ton miles by 11.3 per cent, and mail-ton miles by as much as 24.0 per cent.

With Combination Transports

TWA Hopes to Double Tourist Volume

By Gordon Conley

New York—Trans World Airlines is developing combination coach-first class transports as the standard airliner on its domestic trunk routes. With this equipment plus the new $80 fare on nonstop coast-to-coast flights, TWA expects to more than double its transcontinental tourist volume within the next 12 months.

The carrier will be the first to put large numbers of multi-service transports on domestic routes when it starts operating combination nonstop flights Sept. 25 (AW Aug. 29, p. 16). TWA and other international airlines started using split cabins more than two years ago, but service of this type within the United States has been limited.

Flexible Fleet

TWA believes the combination airliner is the only answer to its biggest problem since the start of air coach: how to schedule convenient flights for both tourist and first-class airline passengers.

Trans World now is converting its fleet of 20 Lockheed 1049Gs to multi-service configuration and will use the combination cabin arrangements on its 24 new 1649 Super Connies when the turboprop airliners are delivered in 1957-58.

"The Super-G was the first aircraft that really lent itself to multi-service configuration," says E. O. Cocke, TWA's vice president-sales and the primary backer of combination cabins and the $80 transcontinental tourist fare. "It's two loading doors and fore and aft passenger facilities made complete separation possible for the first time.

"The 1649s will have the same configuration. We now think they'll be used as multi-service transports."

The airline will use this split arrangement on nonstop 1049G flights between the East and West Coasts:

- **Day service.** Forward cabin will seat 20 passengers in five-abreast coach configuration. Aft will be 43 first-class seats and a lounge.
- **Night flights.** Eight berths will be added to the after cabin, reducing first-class facilities to 27 seats. Tourist section will be the same as transcontinental day service.

Seats on the 1049Gs and 1649s will be attached to tracks, allowing quick conversion from multi-service to first-class or coach.

"As we gain experience in convertibility, we should be able to make the change during turnaround time," says Cocke. "It will give us a highly flexible fleet for both domestic and international service.

"This type of operation will be the trend as we get into bigger and better transports."

Sales Gimmick

Trans World Airlines' present ratio of domestic passenger traffic is averaging approximately 60% tourist and 40% first-class. The $80 fare is a sales gim-

TOURIST SECTION of TWA's new combination-class 1049Gs will seat 20 passengers.

TWA Tourist Growth

	Passengers	Passenger-miles
1949	56,622	49,650,000
1950	146,697	170,270,000
1951	187,136	253,779,000*
1952	382,402	582,493,000†
1953	728,839	1,027,704,000
1954	1,071,237	1,370,919,000
1955		
(First Six Months) .	609,497	666,829,000
(Year Projected) .	(1,403,000)	

* First years of complete transcontinental tourist service and $110 fare.
† Year of $99 transcontinental fare.

mick designed to bring domestic coach volume to a level equal to or higher than the international average of 80% tourist and 20% first-class.

"It's like the family and fly-now-pay-later plans," says Vice President Cocke. "It will increase traffic on Mondays, Tuesdays, Wednesdays and Thursdays and it will even out the peaks and valleys.

"We'll make money on this despite the low fare. The 20% cut will be made up in increased volume. We'll probably take some business away from our competitors, from the nonskeds and also develop some new passenger traffic."

Competition Factor

Competition was an important factor in TWA's decision to slash fares on transcontinental tourist flights. Officials felt they had to match nonsked North American Airlines' low prices in order to compete on this coast-to-coast service.

Trans World's announcement of tariff reductions touched off similar action by American Airlines and United Air Lines, broadening the low-fare tourist operations among scheduled carriers (AW Aug. 22, p. 18). American asked Civil Aeronautics Board for permission to make its new rates effective Sept. 12 to match TWA's starting date. UAL has asked CAB for Sept. 16.

Cocke says early passenger interest in the $80 fare and nonstop transcontinental service indicates it will be highly successful. "We've had a substantial number of telephone inquiries and a large increase in advance reservations—unusual for tourist flights," he reports. "We'll get a definite fix on what the increase will be in late September, but it should more than double coast-to-coast tourist volume."

For the future, Cocke says TWA has no plans to go lower than the $80 fare.

Convair 440 Orders Pass $11-Million Mark

San Diego—Convair will offer its new Model 440 Metropolitan airliner (AW Aug. 29, p. 15) in both 44 and 52-seat versions. Two extra rows of seats will be installed in the forward cabin area to meet the needs of overseas operations.

Delivery of 14 440s worth more than $11,250,000—eleven to Scandinavian Airlines, two to Real Transportes S. A. of Brazil and one to Aero O/Y Finnair—is scheduled to begin in February.

Real Transportes will take another two 52-passenger Metropolitans as substitutes for two Model 340s ordered earlier this year. Continental Air Lines will do the same, taking 44-passenger 440s instead of three 340Bs.

Additional foreign and domestic orders are being negotiated, according to Convair President Joseph T. McNarney. The SAS decision to buy 440s was a setback for the Vickers Viscount. The Scandinavian airline had previously narrowed its final choice to Convairs or the British turboprop. The decision also may influence other European airlines now in the transport market.

The possibility that the U. S. military may finance further development of the twin-engine Convair may have had some influence on these new commercial orders.

Convair's Model 440 will be powered by two Pratt & Whitney Aircraft R2800 piston engines with new cylinder baffles and cylinder head deflectors for improved performance, particularly during climbs for maximum continuous power.

Use of jet engines for additional wing-tip power is being considered for Air Force versions of the Convair transport.

The maximum range of the new transport is given as 1,310 mi. with no wind, a 1,500-lb. fuel reserve under cruise operation at 20,000-ft. and a maximum takeoff weight of 49,100-lbs.

This compares with 1,150 mi. for Model 340. The 52-passenger version of the 440 will have a range of nearly 1,000-mi. under the same flight conditions.

Direct operating costs will be 1.79 cents per seat-mile over an average trip length of 165 mi., according to Convair.

"No transport designed for short and medium range operation can match this figure," McNarney told AVIATION WEEK.

A weather mapping radar nose will be incorporated in the 440 at the buyer's option.

New TCA Coach

Montreal—Trans-Canada Air Lines will inaugurate air coach flights to Florida, Bermuda and the Caribbean Nov. 1. Fares will be up to 34% lower than present first-class tariffs on TCA's southern service.

The airline will operate North Star transports with 50 seats arranged two-abreast. Meals and liquor will be sold on the tourist flights. Passengers will be allowed 44 lb. of free baggage.

National Asks Court To Halt Merger Case

An injunction has been sought by National Airlines in the U. S. Court of Appeals for the District of Columbia to halt further procedural steps by the Civil Aeronautics Board in the Eastern Air Lines-Colonial Airlines merger case pending a review by the Court.

Hearings by CAB have been completed in the case and briefs are due this week. National said that unless a stay is granted it will suffer irreparable injury by loss of its statutory right to a fair and speedy comparative hearing.

In its request for a stay of the merger proceedings, National charged CAB with elimination of these issues:

- **Whether an Eastern-Colonial integration** would be consistent with the public interest.
- **Whether a monopoly** would result from an Eastern-Colonial merger.
- **Whether Eastern controlled Colonial** at the commencement of negotiations.
- **Whether the public interest** would be better served by a National-Colonial integration than an Eastern-Colonial integration.

National claimed "these errors constitute a prejudgment in favor of the Eastern-Colonial merger since the problems raised in the issues so eliminated automatically removes the principal obstacles to approval."

National asked the court to "annul, vacate and set aside" the Board's order limiting the issues of the Eastern-Colonial merger and order CAB to reopen the record and afford National a full hearing.

Airways Pioneer Dies

Harry W. Howard, 63 pioneer airways lighting expert, died last week. He was supervisory airways engineer of the Civil Aeronautics Administration. Howard designed and originated the automatic engine generators for keeping air aid lights in service when local power failed. He also helped install the first lighted airway, from New York to Jacksonville, and at most other major airways in the country.

CAA Finds Viscount Tests Satisfactory

A Civil Aeronautics Administration review of Capital Airline's 100-hour simulated airline operation of the Viscount turboprop transport shows that the British-made plane matched, or exceeded, expectations in almost every field of operation.

A. S. Koch, CAA's aviation safety director, said:

"A good many of the problems anticipated with the Viscount failed to turn up. Generally with a new airplane there are some difficulties expected but they just didn't develop in this case."

He also said that maintenance and operation of the Viscount "seems to fit in well for Capital from a safety standpoint."

The review of Viscount performance data was made at a meeting of CAA engineering and other operations specialists.

The review also provided information on aircraft proving programs for the two CAA officials who will make a three-week tour of European aircraft manufacturing plants.

W. H. Weeks, chief of the Aircraft Engineering Division, and H. W. Helfert, European area supervisor of the International Region, left this week to gather first-hand information on new foreign civil aircraft in the development or test stages.

They will also hold various discussions with several groups of foreign government officials responsible for aviation safety and engineering in their respective countries.

While in England, Weeks will visit the British Air Registration Board and Vickers-Armstrongs, Ltd. He will also represent CAA Administrator Fred B. Lee at the Farnborough Air Show. In Italy, Weeks will present a CAA airworthiness type certificate to the manufacturers of the Piaggio Royal Gull aircraft.

WCTU Hits Airlines

Long Beach, Calif.—The Woman's Christian Temperance Union last week passed a resolution condemning the practice of serving drinks aboard airlines in no uncertain terms.

The resolution, adopted during the WCTU national convention, complained, in part, that airlines have been "soliciting passengers to drink while non-drinkers have to wait for their lunch or dinner" and added:

"The sober public has every right to demand sobriety and safety on the airlines."

Loose Fasteners Cited In CAA Warning

Civil Aeronautics Administration issued an emergency aircraft engine maintenance procedure last week because of an accident investigation indicating the possibility of hazardous results of cylinder barrel failure.

In a series of telegraphic notices to all CAA regions, the power plant engineering branch recommended the following procedure for cylinders subjected to operation with loose studs or cap screws: "In any case where two studs or cap screws are found loose or broken and adjacent studs of screwcaps are found torqued to at least minimum torque values, remove and inspect cylinder for flange warpage and magnaflux for cracks . . . if outside overhaul tolerances, or where more than two studs or capscrews involved, retire cylinder."

It was reported that the accident under investigation was the Aug. 4 crash of an American Airlines' Convair 240 at Fort Leonard Wood, Mo., which indicated a cylinder that had barrel failure had previously been subjected to operation with a loose stud.

Handley Page Herald Inaugural Flight

The Handley Page Herald prototype, designed as a transport-freighter replacement for the DC-3, made its first flight on Aug. 25 from Radlett Airport, Hertfordshire. Australia National Airways already has ordered a number of the four-engined, 44-passenger craft which, when converted into freighter configuration, can carry some five tons of cargo.

Safety Unit Approved

A safety device that warns pilots against inadvertent retraction of landing gear on the Beechcraft C18S has been approved by the Civil Aeronautics Administration. Inventor of the warning device, Frank P. Davis, deputy chief of CAA's Aircraft Control Division, received an award of $250 for the invention from CAA.

The device consists of a guard over the gear retraction switch which, if it is lifted while the plane is on the ground, or at any time the plane does not have flying speed, sounds a horn in the cockpit. Davis estimates that a kit for the device could be sold for about $10 and installation should not cost more than $25. Details of the warning unit, including drawings for installation, are available on request at CAA in Washington.

CAB ORDERS

(Aug. 18-24)

GRANTED:

Trans-Pacific Airlines an exemption to provide free transportation to one tour conductor when accompanying 15 or more persons on an advertised tour in the Hawaiian Islands, for one year.

United Air Lines and Burlington, Iowa, permission to intervene in an investigation of the need for air service by Ozark Air Lines between Peoria, Ill., and Fort Dodge, Iowa, via Galesburg, Ill., and Burlington, Ottumwa and Des Moines, Iowa.

Permission to intervene in the Mackey Airlines certificate renewal case to the Post Office Dept., the Broward County, Fla., Board of Commissioners and the Palm Beach Chamber of Commerce.

Ozark Air Lines authority to suspend service at Columbia, Mo., until the runway at Columbia Municipal Airport is made safe for scheduled service.

Permission to intervene in the ACTA-IMATA commercial charter exchange investigation to Aerovias Sud Americana, Flying Tiger Line, Slick Airways and Seaboard & Western Airlines on the issue of whether they should be allowed to participate in a clearing house arrangement proposed by the examiner.

Flying Tiger Line an exemption to perform a flight from New York to Geneva, Switzerland, pursuant to a contract with Moral Rearmament.

APPROVED:

Agreements between Delta Air Lines, Trans World Airlines and various other carriers relating to inter-carrier arrangements.

Braniff Airways and Eastern Air Lines' supplemental agreement relating to their Balboa interchange agreement.

Agreements between American Airlines, Mohawk Airlines and various other carriers relating to inter-carrier arrangements.

ORDERED:

Effectiveness of CAB's cease and desist

EMPLOYMENT OPPORTUNITIES

order in the North American Airlines' compliance case postponed from Aug. 30 to Sept. 3 to allow time for court hearing on North American's petition for stay.

Lake Central Airlines' temporary mail rate set at the rate proposed by the Board in its show cause order for the period starting May 2, 1955.

Suspension and investigation of a Trans World Airlines excursion fare between San Francisco and Las Vegas.

Application of Eastern Air Lines for a route between Tampa, Fla., and Nassau, B. W. I., and application of National Airlines for routes between Nassau and West Palm Beach and Havana consolidated with the Mackey Airlines certificate renewal case. Various other motions for consolidation by Eastern, National, Pan American World Airways and Delta-C & S Air Lines are denied.

DISMISSED:

Application of Lancaster, Pa., for air transportation to Washington, D. C., at the request of the applicant.

DENIED:

Permission to intervene in the New York-Florida Service Case to the Greater Pensacola, Fla., Chamber of Commerce, the Marianna-Jackson County, Fla., Chamber of Commerce, the City and Chamber of Commerce of Atlantic City, N. J., the Atlantic City Hotel Assn., the Pittsburgh, Pa., Chamber of Commerce and the State of Connecticut.

North Central Airlines permission to serve Chicago through O'Hare Airport.

SHORTLINES

▶ **British Overseas Airways Corp.** carried 150,600 lb. of cargo between U. S. ports and the United Kingdom in June, a gain of 28% over June, 1954.

▶ **British West Indian Airways** expects to start Viscount service Nov. 5 between New York and Trinidad via Bermuda, San Juan and Barbados.

▶ **East Germany** has signed air agreements with Bulgaria and Czechoslovakia to cover operations of the new East German Lufthansa.

▶ **Swissair** has opened a new $125,000 flight kitchen at Idlewild Airport to serve trans-Atlantic flights.

▶ **Trans-Texas Airways** flew 13,784 passengers in July, 13% more than the previous July. Load factor was 40%, compared with 33% in July 1954.

▶ **British European Airways** has inaugurated a twice-weekly direct service between London and Cairo. The Viscount flights are designed as a businessman's service. . . . BEA reports summer traffic up 25% over last year.

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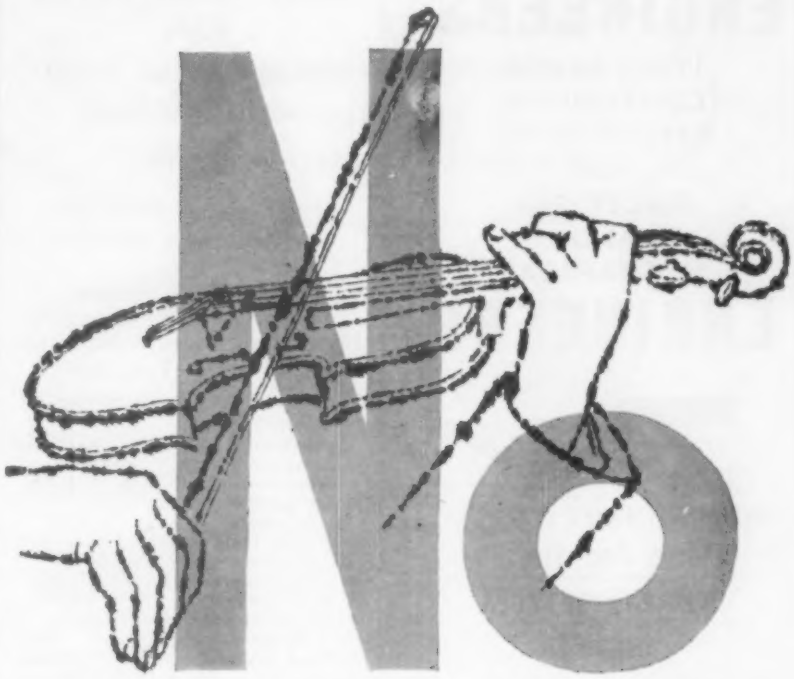

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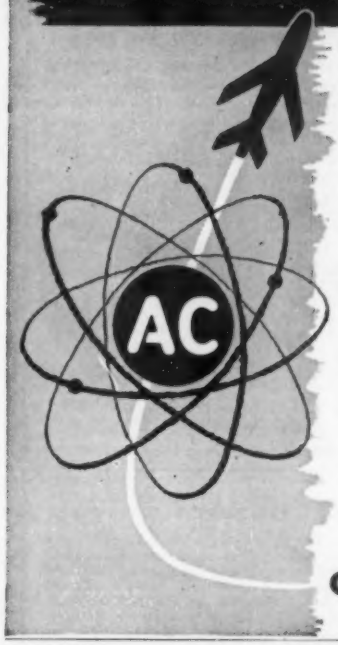

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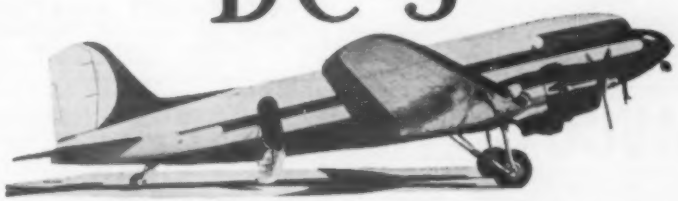

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ADVERTISERS IN THIS ISSUE

AVIATION WEEK—SEPTEMBER 5, 1955

ADMIRAL CORPORATION (GOVERNMENT LABORATORIES DIV.) 50
Agency—Cruttenden & Eger Associates Adv.
AERO SUPPLY MFG. CO. INC. 67
AIRBORNE ACCESSORIES CORP. 8
Agency—Gray & Rogers Adv.
AIRCOOLED MOTORS, INC. 25
Agency—Richards & Webb, Inc.
AIRCRAFT EQUIPMENT TESTING COMPANY 8
Agency—Mahool Advertising, Inc.
AIRESEARCH AVIATION SERVICE DIV. THE GARRET CORP. 90
Agency—J. Walter Thompson Co.
AIRWORK CORPORATION 10
Agency—Gene Wyhle Advertising
AMERICAN ELECTRONICS, INC. (MINIATURE COMPONENTS DIV.) 67
Agency—Clyde D. Graham, Adv.
AMERICAN MACHINE & FOUNDRY COMPANY.. 62
Agency—Fletcher D. Richards, Inc.
AMPEX CORPORATION 64
Agency—Boland Associates, Adv.
ARROWHEAD RUBBER CO. DIV. OF NATIONAL MOTOR BEARING CO., INC. 84
Agency—Dan Ebberts Adv. Service
AUBURN SPARK PLUG CO., INC. 30
Agency—Richards & Webb, Inc.

BASCH COMPANY, GEORGE 79
Agency—Davis, Parsons & Strohmeier, Inc.
BRIDGEPORT THERMOSTAT DIV., ROBERT-SHAW-FULTON CONTROLS CO. 59
Agency—Arndt-Preston-Chapin-Lamb & Keen, Inc.
BRILES MFG. COMPANY 77
Agency—McKee-Burns Advertising
BUCKEYE IRON & BRASS WORKS 81
Agency—Kircher, Helton & Collett, Inc.
BURROUGHS CORPORATION 19
Agency—Campbell-Ewald Company, Adv.

CHAIN BELT COMPANY, SHAFER BEARING DIV. 53
Agency—The Buchen Company
CHANCE VOUGHT AIRCRAFT, INC. 60, 61
Agency—Ruthrauff & Ryan, Inc.
CINCINNATI MILLING MACHINE CO., THE... 20
Agency—The Keelor & Stites Company
CLEVELAND PNEUMATIC TOOL CO. 66
Agency—Meldrum & Fewsmith, Inc.
CONVAIR A DIV. OF GENERAL DYNAMICS CORP. 82
Agency—Pacific Western Adv. Agency
CO-OPERATIVE INDUSTRIES 36
Agency—Richard LaFond Adv., Inc.

deHAVILLAND AIRCRAFT OF CANADA LTD., THE 81
Agency—Paul-Taylor-Phelan, Ltd.
DOW CORNING CORPORATION 4
Agency—Wagnitz Advertising, Inc.

EATON MANUFACTURING CO. (AIRCRAFT DIV.) 49
Agency—Clarke & Boberts, Inc.
EASTMAN KODAK CO. (X-RAY DIVISION).... 47
Agency—J. Walter Thompson Co.
ECLIPSE-PIONEER DIV., BENDIX AVIATION CORP. 93
Agency—MacManus, John & Adams, Inc.
EX-CELL-O CORPORATION 30
Agency—Holden-Chapin-Larue, Inc.

FAIRCHILD ENGINE & AIRPLANE CORP..... 109
Agency—Gaynor & Company, Inc.
FEDERAL TELEPHONE & RADIO CO. (COMPONENTS DIV.) 60
Agency—J. M. Mathes, Inc.
FOOTE BROS. GEAR & MACHINE CORP..... 31

GENERAL ELECTRIC COMPANY 34
Agency—G. M. Basford Company
GOODRICH CO., THE B. F. 3
Agency—Batten, Barton, Durstine & Osborn, Inc.
GOODYEAR AIRCRAFT CORP. 89
Agency—Kudner Agency, Inc.
GRUMMAN AIRCRAFT ENGINEERING CORP. Front Cover
Agency—Fuller & Smith & Ross, Inc.

HARNISCHFEGER CORPORATION (WELDING DIV.) 58
Agency—Hoffman & York, Inc., Adv.
HASSALL, INC., JOHN 83
Agency—Sanger-Funnell, Inc.

INDIANA GEAR WORKS, INC. 75
Agency—Bozell & Jacobs, Inc.

KAISER METAL PRODUCTS, INC. (FLEETWINGS DIV.) 45
Agency—Gray & Rogers Adv.

LEACH RELAY CO., DIV. OF LEACH CORP. Third Cover
Agency—Hixson & Jorgensen, Inc. Adv.
LINK AVIATION, INC. 44
Agency—Gaynor & Co., Inc.
LOUD MACHINE WORKS, INC. H. W..... 24
Agency—Walter C. Davison Company

MALLORY-SHARON TITANIUM CORP..... 26
Agency—The Griswold-Eshleman Co.
MARQUARDT AIRCRAFT COMPANY.....27, 72
Agency Heintz & Co., Inc.
MOOG VALVE CO., INC. 46
Agency—Warman, Robins & Gurham, Inc.

NORTHROP AIRCRAFT, INC. 109
Agency—West-Marquis, Inc.
NORTH AMERICAN AVIATION, INC. 91
Agency—Batten, Barton, Durstine & Osborn, Inc.

PACIFIC DIV., BENDIX AVIATION CORP..... 82
Agency—The Shaw Company Adv.
PARKER AIRCRAFT COMPANY 94
Agency—Willard G. Gregory & Co. Adv.
PATENT PRODUCTION DEPT. 69
PIONEER CENTRAL DIV. BENDIX AVIATION CORP. 74
Agency—MacManus, John & Adams, Inc.
PRATT & WHITNEY AIRCRAFT DIV., UNITED AIRCRAFT CORP. 87
Agency—Lennen & Newell, Inc.
PYE TELECOMMUNICATIONS LIMITED..... 38
Agency—Arks Publicity Limited

RADIO CORP. OF AMERICA (ENGINEERING PRODUCTS DIV.) 56, 57
Agency—Al Paul Lefton Co., Inc.
REACTION MOTORS, INC. 78
Agency—J. Wheelock Associates
RED BANK DIV., BENDIX AVIATION CORP....86
Agency—MacManus, John & Adams, Inc.
ROBINSON CO., RALPH C. 79
Agency—Chapin-Danno Adv.
ROHR AIRCRAFT CORPORATION 92
Agency—Barnes Chase Company
ROLLS-ROYCE LTD. 37
Agency—The Wesley Assoc.

SEARCHLIGHT SECTION.....100, 101, 102, 103, 104 105, 106, 107, 108
SERVOMECHANISMS, INC. .....Fourth Cover
Agency—Sanger-Funnell, Inc.
SHAFER BEARING DIV., CHAIN BELT COMPANY 53
Agency—The Buchen Company
SKYLINE PRODUCTS, INC. 69
Agency—Triton Advertising
SOLAR AIRCRAFT COMPANY 88
Agency—The Phillips-Ramsey Co. Adv.
SOLARTRON ELECTRONICS GROUP LTD. THE.. 76
Agency—James A. Hodgson Ltd.
SPENCER THERMOSTAT DIV., METALS & CONTROLS CORP. 85
Agency—Sutherland-Abbott Adv.
STRATOS A DIV. OF FAIRCHILD ENGINE & AIRPLANE CORP. 54
Agency—Gaynor & Company, Inc.
SUNDSTRAND MACHINE & TOOL CO...Second Cover
Agency—Howard H. Monk & Assoc.
SURFACE COMBUSTION CORP. (PANITROL AIRCRAFT-AUTOMOTIVE DIV.) 70, 71
Agency—Odiorne Industrial Adv.

VICKERS, INC. DIV. OF SPERRY RAND CORP. 55
Agency—Witte & Burden Adv.

WESTERN GEAR WORKS 73
Agency—Ruthrauff & Ryan, Inc.
WESTINGHOUSE ELECTRIC CORP.....41, 42, 43
Agency—Fuller & Smith & Ross, Inc.
WYMAN GORDON CO. 6
Agency—John W. Odlin Co., Inc.

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FOR SALE 106-108
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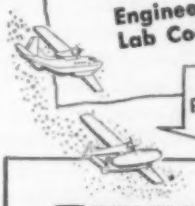

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EDITORIAL

Quarles Choice Is Significant

Selection of Donald A. Quarles as the new Secretary of the Air Force is a wise and significant appointment. Mr. Quarles has long experience in industrial science, and he now has a background of more than two years in the Pentagon in its top research and development job. During his service as Assistant Secretary of Defense for Research and Development he became intimately acquainted with the Pentagon problems of inter-service rivalries, the knots still snarling military-industry research and development relations, and more recently with the vital technological race with Russia in the development of nuclear weapons and their aerial delivery systems.

The appointment of Mr. Quarles to the top USAF post is further evidence that this technological race with Russia is of critical importance. This is the first time a man whose background was predominantly scientific has held either the USAF Secretaryship or its earlier equivalent under the old War Department organization.

It again proves that, despite the political smokescreen raised by the Secretary of Defense when AVIATION WEEK first revealed the extent of the latest Russian progress in atomic airpower development (AW May 23, p. 12), both the Pentagon and the Eisenhower Administration now regard the aeronautical pace of the Soviets as critical and calling for decisive and sustained action.

Since May when AVIATION WEEK exclusively revealed the numbers and types of new Russian jet aircraft displayed over Moscow, the Air Force has taken the following steps to speed its weapons program:

- **Accelerated Boeing B-52** long range bomber production by 35% (AW June 6, p. 12).
- **Accelerated production of the McDonnell F-101** long range interceptor and escort fighter with atomic bomb carrying capabilities (AW June 27, p. 12).
- **Accelerated production of the Lockheed F-104** supersonic day fighter (AW June 27, p. 12).
- **Increased the scope and expanded** the size of its basic scientific research effort through the new Office of Scientific Research headed by Brig. Gen. Don Flickinger (AW July 18, p. 12).
- **Attempted acceleration** of the weapon system development cycle by eliminating preliminary design competitions (AW Aug. 8, p. 12).

The appointment of a top scientific man as Secretary of the Air Force is the sixth major action taken by the Defense Department during the past three months to bolster its aerial weapons development program. This is ample confirmation of AVIATION WEEK's editorial warning on May 23 that top level Pentagon leaders were "deeply shocked" by the Russian airpower displays and that our grave concern was no false cry of "wolf" but a genuine danger signal to national survival.

Mr. Quarles is fortunate in finding an excellent quartet of civilian assistants to help him in his new job. Whatever else may be said about former Secretary Harold E. Talbott (and we will have more to say about him soon) he recruited an excellent second tier in his USAF civilian secretariat. James Douglas, Under Secretary, Trevor Gardner, Assistant Secretary for Research and Development, Roger Lewis, Assistant Secretary for Materiel, and Lee White and Lyle Garlock, Assistant Secretaries for Financial Management, have all performed their specialized tasks with consistent distinction and considerable courage in the face of obstacles. The return of Roger Lewis to private industry at the end of this month will be a genuine loss to USAF.

We believe that the American people are counting on Mr. Quarles to produce major progress in aerial weapons development to once again establish the clear and unchallenged superiority of American airpower. We also believe that if he makes it unmistakably clear to the American people that this is his policy and backs it with appropriate action they will support him.

General Boatner Retires

The retirement of Lt. Gen. Bryant L. Boatner last week at the age of 48 after a distinguished career in development, production, modification and testing of aerial weapon systems throws a spotlight on a problem that is giving the Air Force serious concern. Gen. Boatner retired for physical reasons after a series of heart attacks. There is little doubt that these attacks were induced by the strain, pressures and responsibilities of the key positions he held in the USAF weapon systems development and production program. At the very time when his experience had uniquely qualified him for top level posts in this field and his age would have normally permitted USAF to enjoy at least another ten years of his service, Gen. Boatner is forced to leave the service, a victim of the tremendous pressures and strains generated by top level posts in what is now the most important military organization this country has ever had. Gen. Boatner's case is typical of what has been happening to many of USAF's younger generals in top spots.

In his last post, as Deputy Chief of Staff for Materiel, with responsibilities for both development and production of weapon systems, he made notable contributions in the always difficult relations between the research and production organizations. The assignment of clear executive responsibility for weapon systems to either Air Research and Development Command or Air Materiel Command during the development and production cycle was a major step in the right direction. Gen. Boatner was also a strong champion of the subcontractor and components producer as an integral and valuable part of the USAF materiel structure and made special efforts to protect their rights.

Both USAF and the aircraft industry have suffered a genuine loss in the premature retirement of Gen. Boatner. His case poses a problem that the leaders of both USAF and the aircraft industry should study closely to prevent further loss of able, experienced executives and commanders. —Robert Hotz

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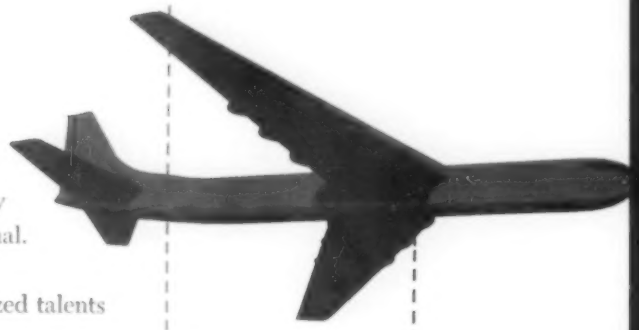

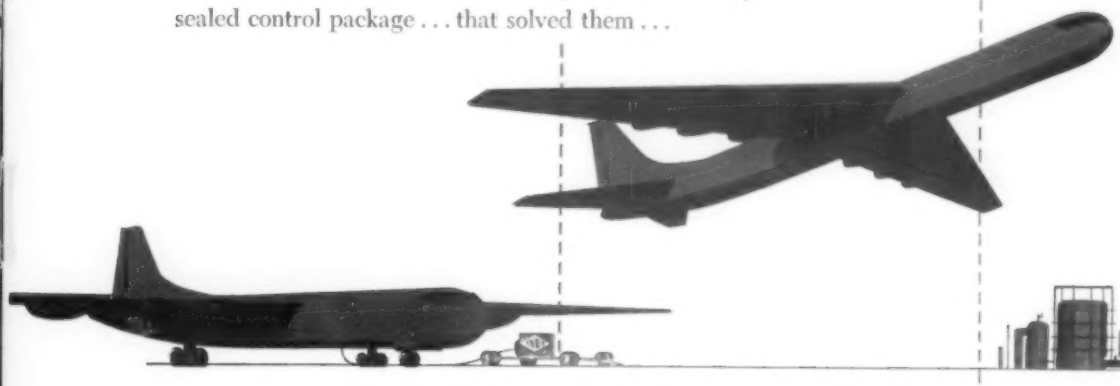

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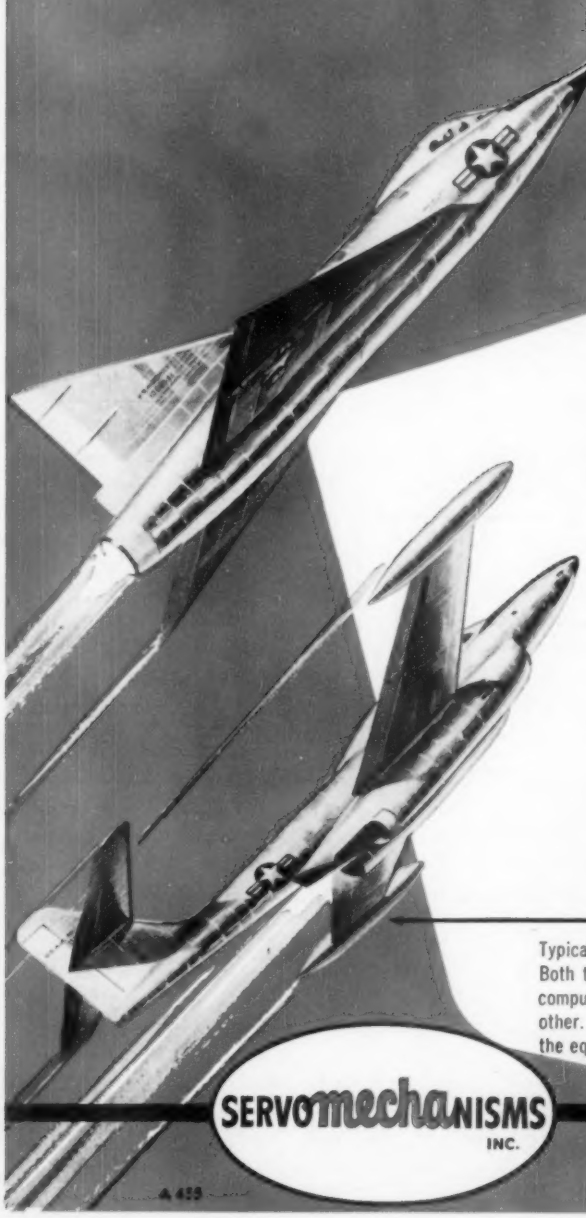

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Write for Air Data Computer Brochure, GA3.

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A 459